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Radio Control

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September 1993

CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

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FOR UNDER **\$20**
—page 55



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TIPS—**
*more speed
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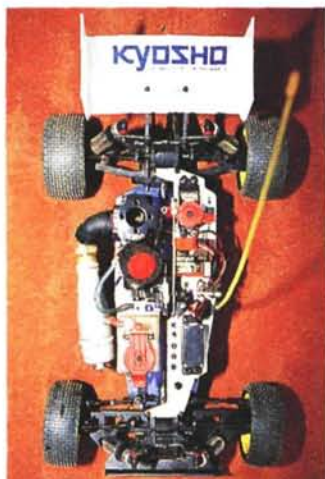
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EDITORIAL

WHAT'S HOT—WHAT'S NOT

I can't believe that the summer is almost over already. It seems like only yesterday that we were welcoming in the New Year. Anyway, it's now far enough into the R/C season to make a few observations as to what's popular in '93 and what's on its way out.

Gas-powered R/C cars and trucks are hot this year. If you've been fortunate enough to get out to one of the Kyosho/*Car Action* gas races, you know that some of the best electric drivers in the world have been cutting their nitro teeth behind the wheel (well, the transmitter, anyway) of super-fast, 1/8-scale buggies. The competition at these events is furious and growing, and the spectator turnout has been astonishing: onlookers line the entire track two deep for the main events. It's my sincere hope that more clubs and tracks across the country will get in on this fast and fun segment of the R/C hobby.



Increased interest in banked-oval racing and in gas cars has led to the release of some very interesting hardware. This 1/10-scale Kyosho "Mini-Inferno" and Trinity's new EV10ss are just part of the latest batch of goodies.

High-banked superspeedway racing seems more popular than ever. I guess this is only natural, since NASCAR is so well-loved by racing fans all over the U.S. How do I gauge this popularity? I've been told by PROCAR that more than 130 tracks have signed up to hold qualifying races this year. Not enough proof for you? Let's look at the manufacturing end of the hobby. I've seen more new superspeedway goodies released this year than ever before, and we're talkin' hi-zoot stuff here, ladies and gents.

On the local level, off-road racing is holding its own, but on higher levels, some work is needed to ensure that off-road remains the realm of the masses—not the factory teams.

What do I mean by this? The "Win on Sunday, sell on Monday" theory applies to R/C racing, but I think that there's a higher purpose involved: public relations. In my opinion, how drivers perform off the drivers' stand is as important as how they perform when they're on it. Yes, a racer who spends his

hard-earned money to go to the Nats will remember which car won the event, but he will also remember which team's drivers were courteous and open, and which team's drivers weren't. Word of mouth is a powerful marketing tool. More people should use it.

Frank

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NEWS

OPTIMIZING WORLD SCALE'S STEERING SYSTEM



In any serious form of R/C racing, squeezing the best handling performance from your machine is crucial. Here are some suggestions for getting the most from your World Scale Thunder King, Desert Thunder or Baja King's steering components.

Every racecourse is different, and so is every R/C driver, so there isn't one perfect steering setup for everybody, everywhere. There is, however, surely one setup that's right for you. If your World Scale racer needs a little more steering, try these simple tricks.

1) If you use one standard servo in your World Scale racer, add an identical, second steering servo. A second heavy-duty servo-saver is included in every World Scale Off-Road kit. All you'll need is the correct Y-harness to connect the two servos to a single receiver plug. A Y-harness allows both servos to plug in and operate simultaneously from the single steering channel of your radio. They're readily available from every major manufacturer of radio-control hobby equipment.

2) Add sponge foam to each of your Thunder King, Desert Thunder, or Baja King's tires; it will help to prevent the tires from sagging as the truck powers around the tightest corners. It will also make the ribs of the tires more rigid, reducing "push" while boosting your truck's steering power.

3) To increase steering response on some racing surfaces (but not all), clip off the dashed parts of the Baja King's front tires with a sharp pair of snips. This may be something of a no-brainer for many of you, but you can get very noticeable results in a hurry.

Be sure to check out the MRC/Trinity Dash for Cash for World Scale Off-Road, coming to the Ranch Pit Shop in Pomona, CA, from September 17-19!

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LETTERS

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

READERS' RIDES RIDE AGAIN—IN COLOR

Who says we don't listen? Because you, our loyal readers, demanded it, "Readers' Rides" is now back in glorious color. Now before you get the idea that we'll do *anything* you want us to, stop right there! The first wise guy who writes in requesting a Cindy Crawford pullout poster will have his subscription cancelled!

MO' BETTER BONES

Your magazine is great! It's a lot better than those poser magazines out there. I have a question. I own a JRX Pro-SE, and I use the stock sliders that come with the kit. Would there be a noticeable difference in performance if I replaced them with dogbones? Also, I race with a stock motor on a dusty track. Should I use a foam motor endbell cover? I've heard that I would sacrifice performance, but extend my motor's life.

DAN HAUGHT
Cary, NC

Well, Dan, if you use a set of dogbones, they'll bind a little more than the kit's original slider shafts. Dogbones will keep the suspension flatter while the car is "on power"—when the throttle is fully applied. They also minimize weight transference from side to side, so the chassis doesn't roll as much. If you equip your car with dogbones, it won't go through bumps as well, either.

The slider shafts' action tends to be more free: there isn't as much binding. On tracks where your car has less bite, they'll allow more weight transfer

(more chassis roll in the corners) for smoother, more predictable cornering. The slider shafts also go over the bumps better.

As for the foam endbell cover, I have mixed feelings. Race Prep has an accessory foam endbell cover for its motors that seems to work very well. It's a coarse foam filter that doesn't restrict airflow, and it doesn't affect performance. Depending on your track conditions, though, I really don't think that you need one—unless you're driving your car out on the beach! JH

IS THERE ANYBODY OUT THERE?

I am new to R/C cars. After spending many years—and a lot of money—crashing planes, I decided to try gas cars. I bought a used (very used) Kyosho Assault. After I replaced the engine, the clutch, the dogbones, the front spindles, the trailing arms, the tie rods, four tires—well, you get the picture—it was running pretty well, and I was having a blast.

Now, the bad news. I need a differential spur-gear assembly (part no. SCO56). It appears to be made of a rare material called "un-obtainium." After a day of calling every advertiser listed in your mag, I knew the response by heart: "discontinued, no longer available—sorry." I know that someone, somewhere has this part. They don't evaporate when the manufacturers discontinue them. Perhaps you can help me get back on track by publishing my plea for help. I really like your magazine, and I wish that I had read a few more issues before I bought my Assault. I probably would have passed on it and bought a new gas car that had parts readily available.

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First of all, I have to tell you that your mag is great. In Germany, there's nothing that's comparable. Keep up your great work. Now to the reason of my letter. This is an R/C emergency! I understand that you can't respond to every letter that you receive, but this time I need your help; it's urgent. A while ago, I read about the MRP High Roller, and since then, I wanted to get one. After several phone calls to the USA, I found a built one, and I had it shipped to Germany. Unfortunately, it arrived with all the suspension parts broken (probably due to rough handling).

After dozens of phone calls to MRP and all the major mail-order companies that have ads in your magazine, I've found neither spare parts nor a complete kit. Now, I guess somebody in the whole USA has to have a complete High Roller kit somewhere on a hobby-shop shelf, so please print my letter and help me save my R/C soul and the poor High Roller that sits broken on my workbench.

MARKUS WIDCZISK

Mozartstrasse 20

D-63179 Obertshausen, Germany

Telephone: 01149-6104-42938

There has to be someone out there in Readerland who can help these guys! JH

GLO TO GO

I'm interested in buying a Traxxas Nitro Hawk. I'm new at gas off-roading, and I'm wondering if a glow-plug igniter is necessary for operating the machine. Also, will the Futaba S148 servo be sufficient for operation?

DOYLE WELLMAN

Fall Creek, WI

Yes, Doyle, you will need a glow-plug igniter to get your Nitro Hawk fired up. The only 1/10-scale nitro truck that doesn't need a glow-plug igniter is the Schumacher Nitro 4x4. It has an on-board ignition system: press a button, pull the recoil starter, and you're off and running. As for your servo, the S148 will be fine for your truck—for the steering or the throttle servo. JH

(Continued on page 148)

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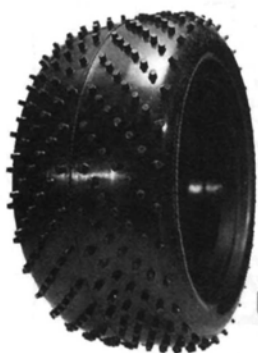
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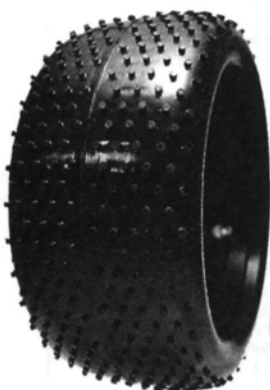
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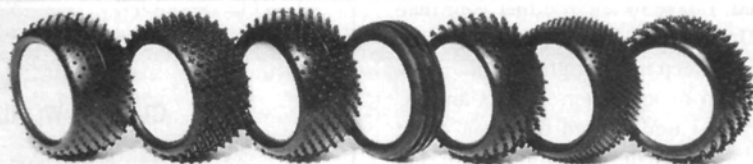
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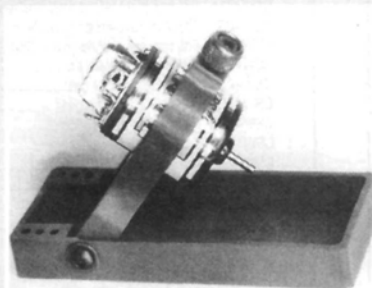


S&K

Motor Station

Working on your motor in the pits can be a pain, but it doesn't have to be. The S&K Motor Station folds flat for storage, and its base serves as a parts tray. There are six holes to hold your armatures; no need to dump them on the table!

Part no.—SKMS20; **price**—\$12.95.



S&K Racing Products, 215 South Market St., Oskaloosa, IA 52577; (515) 673-6930.

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Part no.—JRP2427 (27MHz), JR2475 (75MHz); **price**—\$99.95.

JR, Dept. EI, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.



RPM Servo-Mounting Posts

RPM's sturdy servo-mounting posts can be mounted solidly on a large flanged bottom, and they're thin at the top to clear components. There are four, molded-in "height adjustments," and the

posts come with two servo screws and two 4-40 flat-head screws.

Part no.—7006; **price**—\$2.50/pair.

RPM, 14978 Sierra Bonita Ln., Chino, CA 91710; (714) 393-0366.

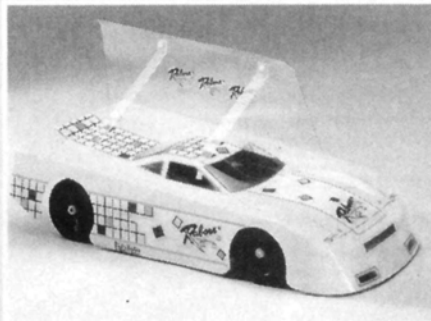


RABORN

Invencer X-10

The Invencer X-10's front and rear A-arms are the same, and the front and rear bulkheads will fit the left or the right of the car, as will the caster block and hub carrier. Having parts that will fit both front and rear and left and right reduces the number of spare parts you need. The front-suspension bulkheads have four caster settings: 10, 15, 20 and 25 degrees, and they can be adjusted quickly, so you can dial-in your car faster. The highlight of the kit is the diff, which is smoother and lighter than any other oval diff. The kit includes foam tires, a body, hard-anodized shock bodies, ball bearings, polished hinge pins and graphite components.

Raborn Racing Originals, 6707 Chimney Rock, Bellaire, TX 77401; (713) 668-8866.



TRINITY®

"Laying Down" on the Job



Getting caught lying down on the job is no good, unless, of course, you're a mattress tester or the newest advance in motor technology from Trinity. One part of our new EX•Technology—developed by Trinity and

featured on the Slot Machine 2—is the "laydown" motor-brush system. We turned the motor brushes 90 degrees, so that the footprint on the commutator is now wider than it is high. This way, as the brush breaks in, more of the brush will wrap around the commutator. This produces higher efficiency and more rpm—sort of like reaching electric motor nirvana.

The laydown brush system is a definite advantage for modified motors, but it really makes a difference in stock motors. The power increase is substantial with a full brush, and really outstanding if you use one of our laydown timed brushes. Using a timed brush will advance the commutator farther in a Slot Machine 2 than a timed brush will in a standard stock motor. Because we have more brush wrap, the armature sees it as if the endbell were rotated more than 24 degrees. As soon as you increase the timing, the rpm will increase.

The best part is that all old motors can be upgraded with our laydown brush conversion kits. These replacement hoods can be installed on any stock or modified motor so that you can use the laydown brush system. All it takes is a few minutes. Of course, the easiest way is simply to buy one of the Slot Machine 2 motors and get all the EX•Technology in one package!

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Slot Machine 2, comes with laydown brushes and new EX•Technology
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New hard laydown motor brushes
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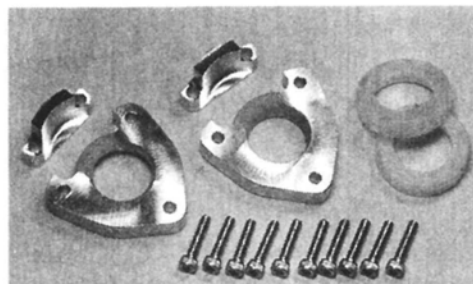
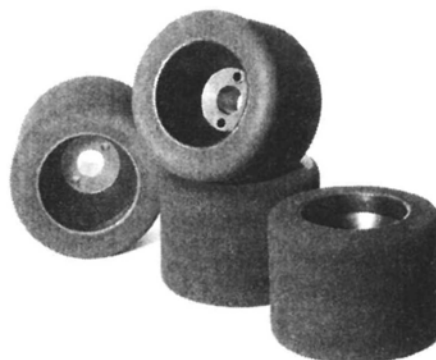
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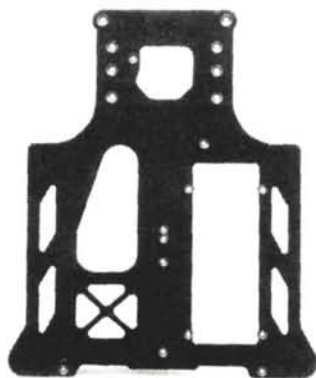
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Pro-Series Chassis

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Advanced Diversified Composites, 7640 Commerce Center Dr., Orlando, FL 32819; (407) 351-6081.



Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here doesn't constitute an endorsement by *Radio Control Car Action*, nor is it a guarantee of product performance or safety. When writing to the manufacturer about any product described here, be sure to say you read about it in *Radio Control Car Action*.

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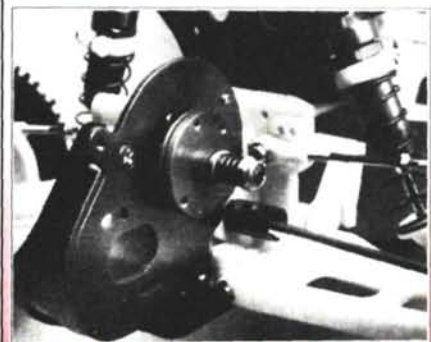
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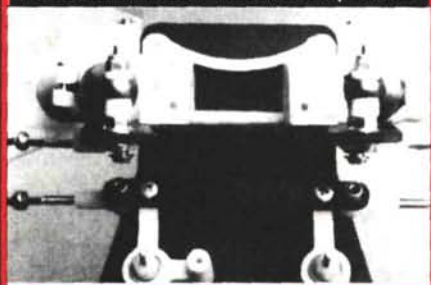
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INSIDE SCOOP



by CHRIS CHIANELLI

IN SEARCH OF FUN AND GLORY, 'CAUSE LIFE'S TOO SHORT TO BE A SHEEP!

Making circles in the dirt with race trucks isn't exactly new, except when it's done with Pro-Line's new Stadium Truck Foam Tires. Combine the light-weight Pro-Line stadium wheels with precision-trued foam, and you get lots of traction. These foam donuts, which are available in blue and green compounds, are also available for the Associated RC10T and the Losi LX-T. Also shown is Pro-Line's Nissan Stadium Truck Body. For more information, contact Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781.



Oval Truckin'

KYOSHO

Under the direction of Kyosho's founder and president, Hisashi Suzuki, a team of Kyosho engineers have developed the SST (Super Sprint Transmission). This gear-driven, state-of-the-art tranny is a departure from the Kyosho belt-drive tradition. Incorporating 12 ball bearings. The lightweight SST has a center-mounted differential which is adjusted externally by means of a 2mm cap screw, while the slipper clutch is quickly adjusted with a single nut. For fast ratio changes, you can change the spur gear without removing the slipper clutch. The inset photo is Kyosho's new 2WD car, which uses the new SST



tranny. Could this be the new Triumph II? Well, whatever its name, it's rumored to be an all-out 2WD effort. Although its similarities to the Triumph are evident, its apparent differences—such as a shorter wheelbase and shorter suspension arms to deal with tighter tracks—seem more significant. Watch the "Scoop" for breaking info (light-years before those other copycat, fish-wrap rags-of-disaster) on these new off-road developments from the creative designers in Atsugi, Japan.



NEW MUGEN SPORT 7

Based on Mugen's Toyota stadium racer, the new Sport 7 was designed to suit the needs of novice racers, but it can be upgraded to an all-out, competition '93 Super Sport racing buggy. The basic kit includes an all-aluminum ball-bearing differential, a quick-change wheel set, hardened-steel planetary gears, a 4mm aluminum chassis and a header/muffler set. The second version includes a rear-exhaust, pull-start .21 that Mugen USA says is powerful, dependable and easy to start. For more information, contact Mugen USA, 910-D Brandy Creek Dr., Mechanicsville, VA 23111; (804) 44-MUGEN.



IT'S A DOUBLE- X TEASE

Here it is, ladies and gentlemen: Team Losi's long-awaited 2WD off-road car—the Double-X! Whoops! So sorry; you can look, but you can't touch—not yet. In the meantime, you can find out more about it in *Radio Control Racer*, which will be on newsstands across the country on August 17. How did we get our hands on the one and only prototype in existence? Cash talks: we bribed Gil Losi Jr.'s personal pizza boy, who cleverly slipped the prototype into an empty medium-pie box during a delivery. Junior is always seriously distracted by the smell of hot marinara. The switch went off without a hitch when the Double-X prototype was swapped with a cheese calzone. You won't catch a glimpse of this car anywhere else, so don't miss out!

More Cars Motor City

Motor City (in this case, Linden, NJ—home of Trinity Products) has just announced the release of its Revolver 12 series of cars. The cars use the same technology as the highly successful Evolution 10—the car that won the 1/10-scale IFMAR World Champs the first time out. The Revolver 12 is available as a road racer (Revolver 12p) or as an oval car (Revolver 12ss). Both versions come with all-graphite chassis components and the famous Reactive Caster™ front suspension. Features include: super-stiff ADC graphite chassis and pod



Winning is What Separates Champions From Everyone Else. And We've Won It All!

- ☐ IFMAR 1/10th, On-Road Modified World Championship - Joel Johnson
- ☐ ROAR 1/10th, On-Road, Modified National Championship - Joel Johnson
- ☐ ROAR 1/12th, On-Road, Modified National Championship - Joel Johnson
- ☐ 4-Cell Modified Winter Nationals Modified Championship - Mike Blackstock
- ☐ U.S. Oval Masters Modified Championship - Mike Blackstock
- ☐ ROAR 1/10th Speedway Modified National Champion - Ernie Bucci

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s from ty?!

Flash!

Revolver 12 Wins 1/12-scale Modified at ROAR Oval Nats while breaking Whipp track record and wins On-Road Nats in Orlando, FL.



plates; precision-machined aluminum pod plates and hubs; graphite Pro Diff with Magic spur gear; and TRC green-dot, mounted and trued tires. Contact

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Stormer Racing now imports the latest and hottest Yokomo products. They now have in stock the Honda NSX and the 4WD Works '93, and all its parts backup for this hot off-roader.



Stormer's future plans also include other Yokomo products from their extensive high-quality line. Stay tuned to the pages of "Scoop" for further Yokomo/Stormer updates. For more information, contact Stormer Racing, P.O. Box 126, 23 High Speed Rd., Glasgow, MT 59230-0126; (406) 228-4569; fax (406) 228-8152.

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Radio Control CAR ACTION THE MOVIE

The formula that has made *Car Action* magazine so popular with R/C car enthusiasts is now being presented by *Car Action* in video form, and it's called "ActionTrax." Like the magazine, this quarterly video magazine (plus bonus volumes) will include such things as Readers' Rides (home videos of R/C creations), Track Reports (the first issue is the Mugen SS 4WD truck), Crash of the Month (my favorite) and interesting features like R/C lunar vehicles. Watch the pages of *Car Action's* Buyers' Mart for purchasing details.

MARRIAGE ANNOUNCEMENT

It gives me great pleasure to announce the engagement of our illustrious executive editor Frank "Howdy-Doody" Masi to Genny the Giant Doll. This is sure to be a marriage of fun and financial bliss. Not only will Genny share her pinwheel bubble machine with Frank, but Frank adds, "Being the same size, we can share clothing and save money for our future dream puppet/doll house!" Good luck kids.



MRC Hits the Hobby Shops on A WORLD SCALE

Walt's Hobby Shop, in Syracuse, NY, recently held a five-week series of World Scale Races that were co-sponsored by MRC. The winners received either new MRC World Scale T-shirts—like the one modeled here by the beautiful Julie Soriano (Air Age editorial assistant)—or World Scale Bucks, which you can use to buy parts or accessories for World Scale vehicles. If you would like your local dealers to get involved, have them contact MRC at 200 Carter Dr., Edison, NJ 08818; (908) 248-0400; fax (908) 248-0970.



PARKING-LOT RACING LIVES IN CALIFORNIA



parking-lot racing. Third from the left is Dave Jun of Tamiya Customer Service. The guys have been racing a mix of Tamiya and Kyosho cars. Watch for our new column "Project Parking Lot" in which author Chris Chan will reveal performance secrets for both Tamiya and Kyosho cars.

Everybody has been blah, blah, blahing about parking-lot racing. Well, some guys out in California have done something about it. Left: the F1 drivers at the first series race in Aliso Carlo. Chris Chan (second from the left) of Chan Design has been very active in moving the parking-lot project forward. He has been producing the FORCE (Formula One Radio Control Enthusiast) newsletter devoted to F1



READERS' RIDES

Imagine this scenario: you're kickin' back, flippin' through your new copy of *Car Action*, and then you get to "Readers' Rides." Boom!—you look down, and there it is—your car, in color, in the hottest R/C mag in the world. Think of the fame and fortune that will be bestowed upon you. Pretty cool, huh? Anyway, here are a few requirements you'll have to meet for your photo to be considered. 1. Send us close-up, sharp, detailed, and in-focus photos. 2. No blurry or cluttered images will be accepted, and absolutely no Polaroids. You know the deal: look at the photos that are already in the magazine. If yours doesn't look like theirs, re-shoot it.

If we choose your photo, you'll receive a 6-month subscription to *Car Action*, or an extension of your existing subscription, and you'll also be eligible for our annual "Readers' Ride of the Year" contest. Don't forget to write your name, address, and phone number on your letter and on the back of the photo in case we need to contact you. Wouldn't it be a bummer if we wanted to run a "Home-Built Project" article on your car or truck, and we couldn't get a hold of you? Don't spode out! Send your entries to...

Reader's Rides, R/C Car Action
251 Danbury Rd., Wilton, CT 06897



JACK THE ZIPPER

Jay C. Wiley of Oakland, ME, sent the Ayatollah a picture of his modified Kyosho USA-1. Jay traded two of his tricked-out Tamiya Blackfoots to acquire this rig. Modifications include a new chassis, full ball bearings, a Maxtrax USA-1 cantilever suspension system, Kyosho long Gold shocks, Maxtrax aluminum drive hubs, a Novak

610 RV ESC and a Kyosho Pulsar 2000 radio. The body is a Parma Bigfoot, and a Parma Hemi engine with a wiring kit complements the package.

MARRIED WITH TRUCKS

Newlyweds Mike and Cathy Kremer of Calgary, Alberta, Canada, sent this photo of their Tamiya and Traxxas trucks. Mike modified his Blackfoot with heavy-duty suspension arms and a servo-saver, four DuraTrax Gold shocks, a Thorp complete dogbone rear end, a Futaba 210CB ESC, a Slot Machine



motor with a purple-anodized heat sink and an upright rear shock tower. Cathy's truck, the "Purple Hammer," is still mostly stock. Come on Cathy, you can't let Mike beat you all over the frozen tundra now, can you?

TON O' FUN

Paul Bickel of Albany, NY, sent us this photo of his stunning collection of cars and trucks. In the front row (from left to right) are Paul's RC10T, a Kyosher Stinger MKII and a Heavy Metal tank. In the middle row are a Midnight Pumpkin, a Blackfoot, a Double Dare and a totally modified Clod Buster. In the back is Paul's pride and joy—his 6WD, 6WS flatbed monster truck that started out as a Bullhead. The truck, which took over a year to complete, tows his RC10 Team car.





NASTY NISSAN

Matthew S. Bobb of Port Orchard, WA, sent us a photo of his Project Clod that quickly turned into Project Nissan. The truck features an ESP ladder chassis, 13 Sanyo F-cells, a Novak 828 HV ESC, 6-tooth pinion gears, Thorp ball diffs, complete Trinity ball bearings, ESP's twin-tube lower bumpers with a front skid plate, and working headlights. Future mods include a set of Astro Flight Pullmaster motors.

.....



BIG, BIG TRUCK

This absolutely huge rig comes from Andy Baraba of Queens, NY. It started out as a stock Clod Buster, but as Andy puts it, "I wasn't happy with the way my Clod Buster looked like every other pickup." So the modification process began. Some of the hop-ups include a 24-inch aluminum chassis and 6-inch IMEX rims and tires. The truck also has a horn and idling diesel-motor sound. The all-wheel-drive, 48-inch-long truck is powered by three motors, and it also has a sleeper cab and a storage box. The trailer can haul up to three R/C cars.

GO ITALIA

Merlo Sergio of Paullo Milano, Italy, mailed us this photo of his Tamiya F1 car and the "race box" that his father, Mario, designed. Merlo's car is equipped with a Futaba 210 CB ESC, Trinity 1200 SCRs and Panasonic matched 1700 cells, a Tamiya Sport Tuned motor and a Futaba S148 servo. The car is controlled by a Futaba Attack SR. Merlo races his car in search of the "Tamiya Trophy."

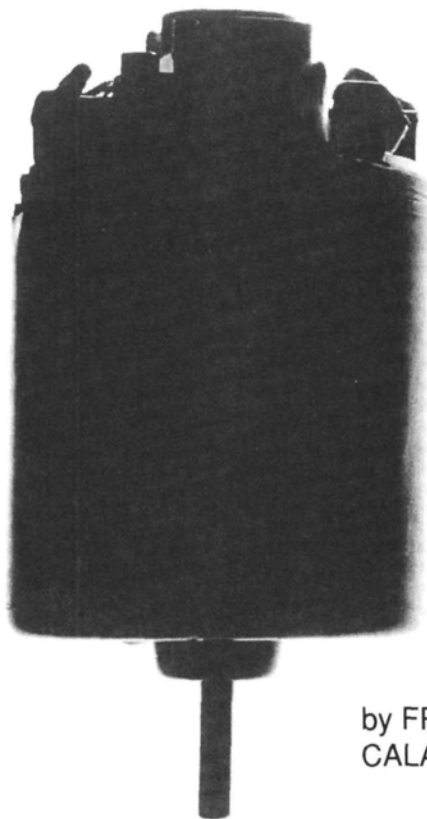


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WALTRIP TWIN

This 1/4-scale, gas-powered twin of the Western Auto NASCAR belongs to Dave Iannone Sr. of Wilmington, DE. Dave was the concours winner in the South Jersey Racing Association Regional Race of 1992. He went on to win third place in the Series East race, and he captured second overall in the SJRA Sportsman Class for 1992.





Motor Tips

from the Pros

by FRANK CALANDRA

Secrets for Success

SURE, YOU KNOW that running a hot, 10-turn, modified motor in your R/C car will make it go fast. But what are you really achieving by bolting in mind-boggling ponies? Although your car might look as if it's blistering down the straights, your lap times will probably be faster if you use a stock motor. Why? Raw horsepower is very different from *usable* horsepower! You get usable horsepower by choosing the correct motor and by tuning it to provide just the right amount of power for the track on which you run.

There are many subtle motor-tuning techniques and procedures that you can use to improve motor performance. From wind selection to brush installation, there are a number of little-known tricks and tips that can mean the difference between winning and losing.

WATER-DIPPING

Water-dipping is a quick way to break-in stock-motor brushes. It's a technique that goes back to the days of slot cars. In R/C racing, this method was very popular when the closed-endbell Igarishi was the only legal stock motor.

Today's stock motors run best when their brushes are

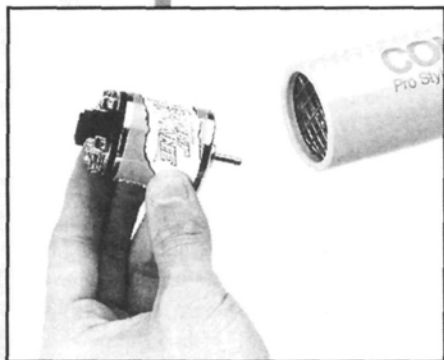
Use a heat gun or a hair dryer to dry the motor after you've dipped it. Spraying the motor with motor spray will also help it to dry.



To water-dip a stock motor, submerge it in a cup of water while it's hooked up to a 6-cell battery—not a power supply.

fully seated. Many brushes require that you run them for very long periods to break them in, and this wears the motor considerably. But, by dipping a running motor in water, you can break-in the brushes in less than 10 seconds.

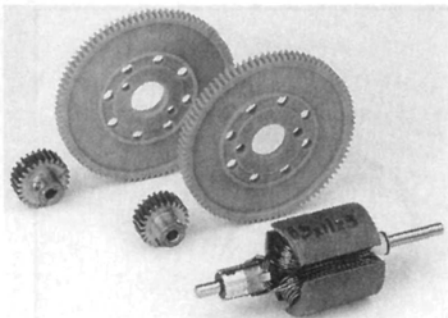
To water-dip a stock motor, fill a plastic cup with enough water to allow the motor to be submerged. Install the brushes as usual, but don't oil the motor bushings yet. Submerge the motor in the water and, using a 6-cell battery, apply power to it. For safety reasons, *don't* use power supplies or motor machines. *Use only a battery!* Run the motor until the water turns gray. This will take from 5 seconds to 1 minute. Remove the motor from the water and inspect the brushes. They should be completely seated to the commutator's surface. Use motor spray and a heat gun to dry the motor completely, but be careful not to overheat the motor with the heat gun. Oil the bushings, and run the motor for 1 to 2 minutes before you install it in the car. Gear it right and hang on! The motor should be fast!



MOTOR TIPS FROM THE PROS

MOTOR WIND AND GEARING SELECTION

When you run a modified motor, the way it delivers its power is as important as the amount of power it delivers. What good is the extra horsepower if you can't deliver it to the track? A smooth, "driveable" power delivery can lead to better driving, cleaner laps and improved race results—especially in off-road. In addition, in on-road racing, the correct power band can mean the difference between finishing strong and dumping early. The number of turns of wire on the armature, the wire size and the way in which it's geared all affect an electric motor's power delivery.



The number of turns of wire on the armature, the wire size and the way in which an electric motor is geared all affect its power delivery.

In off-road, wheel spin in the corners is a major factor in motor wind selection. A motor that accelerates smoothly off the bottom is key to good lap times, especially in 2WD. If wheel spin is a problem, choose a motor that uses small-diameter wire on its armature to reduce the motor's bottom-end punch. Select the hottest wind that you feel comfortable with. Never mind what others are doing; keep notes, record lap times and look for speed and consistency.

Another trick in off-road racing is to overgear the motor excessively. You can "soften" the bottom end of a punchy motor by overgearing it to an extreme. This is comparable to using second gear to start off in a standard-shift, full-scale car. The engine lugs, and the car accelerates much more slowly until it reaches a higher rpm. This is very useful on tracks with tight, slippery infields and very long straightaways. Using a "partial throttle" driving technique, work the infield carefully and smoothly, and then release the extra power down the long straight. Unfortunately, this extra gearing causes excessive heat buildup and battery drain. In most off-road situations, battery

drain isn't a problem, but this technique *will* use up more energy from the cells.

In on-road conditions, horsepower and run time are critical. With the added grip of asphalt, concrete, or carpet, more power can be applied to the track. Good throttle response gives the driver a better "feel" for the power delivery, and this allows more effective throttle driving. Conversely, a motor that sags down into its low-rpm range forces the driver to dig into the trigger to get more speed. At that time, the motor kicks into its power band, and the car overshoots the next corner. The result: slow lap times and run times. For on-road tracks, choose a wind that has good bottom end and that will allow you to drive efficiently.

BRUSH INSTALLATION

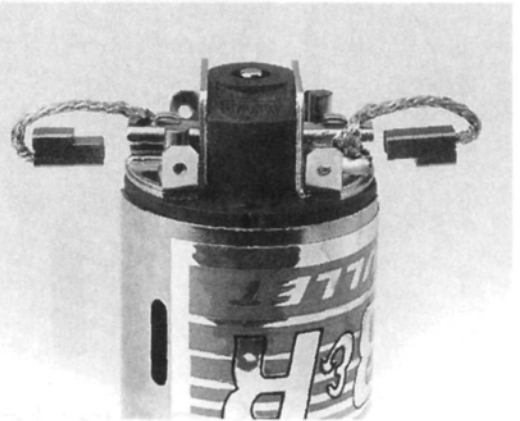
In theory, the best way to install motor brushes is to solder them on instead of using eyelets. Although convenient, the small contact patch between the eyelet and the brush hood can limit current flow from the battery to the motor—especially if the eyelet screw is loose. Consequently, when you build a motor for ultimate horsepower, soldering on the brushes is the best installation method.

Be especially careful when you use solder-on brushes. If they're installed incorrectly, they can have a detrimental effect on power output. The problem lies in the brush "shunt"—the wire that connects the brush to



In theory, the best way to install motor brushes is to solder them on instead of using eyelets. Although convenient, the small contact patch between the eyelet and the brush hood can limit current flow from the battery to the motor—especially if the eyelet screw is loose.

the motor. During soldering, the shunt absorbs—or wicks-in—solder, and this turns the flexible wire into a stiff, rigid cable. This rigid, solder-filled wire resists the efforts of the brush spring. Owing to the shunt's inflexibility, the spring can't keep the brush firmly pressed against the commutator. The brush then bounces off the comm, and this causes excessive arcing, motor damage and power loss.



Horizontal-cut brushes are frequently used in 4-cell, 1/12- and 1/10-scale superspeedway racing. When you use these brushes, install them "one up and the other down."

COMM CARE

Horizontal-cut brushes are frequently used in 4-cell, 1/12- and 1/10-scale superspeedway racing. When you use these brushes, install them "one up and the other down" (see diagram). This simple trick immediately decreases motor wear by 50 percent. With full brushes, the comm touches two brushes per revolution. But with this method, each part of the comm contacts only one brush per revolution. The result: less comm wear, less brush wear and fewer trips to the motor lathe. Furthermore, the decrease in comm damage allows the motor to run better later in a race.

BUSHING USE AND ABUSE

In many cases, stock-motor bushings are too tight and cause drag. As the bushings wear and loosen up, the motor runs with less friction. To speed up bushing wear, apply valve-grinding compound to the armature shaft near the bushings. While the motor is running, push the shaft back and forth to work the compound into the bushing. The abrasive compound will wear the soft bushing without harming the hard-

er armature shaft. This will allow the motor to spin freely, and it will reduce friction. A well-oiled, broken-in bushing will work almost as well as a bearing.



Another "secret" trick? Stuff the brushes with cotton. Use a venturi-type brush, and stuff the hole with material from a cotton swab.

STUFF IT

Another "secret" trick is to stuff the brushes with cotton. The cotton acts as a reservoir for motor drops, and it supplies fluid throughout the race to keep the motor fast and the brushes lubricated and glaze-free.

Use a venturi-type brush (one that has a hole through it) for this trick. You might want to enlarge the hole slightly. Then, stuff the hole with material from a cotton swab. Make sure that the cotton doesn't touch the face of the brush that touches the commutator.

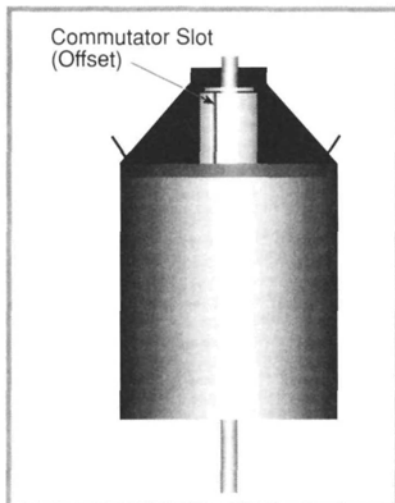
BEARING BLUES

Modified-motor bearings are subject to plenty of abuse. Dirt and brush material can get into them and cause damage, and in most cases, cleaning the motor with motor spray does more harm than good. The spray washes the dirt out of the motor, but the dirt gets into the bearings, and this decreases the performance and life of the motor.

The best way to clean a modified motor is to take it apart and clean it with a cloth. Spray the cloth with motor cleaner and wipe away the brush dust and grime. This method prevents the dirt from working its way into the bearings and destroying them.

CHECK IT OUT

R/C stock motors are made in high quantity



When the commutator is pressed onto the armature shaft, minor differences in quality control can cause one motor's timing to be slightly more advanced than that of another similar one. Choose the motor whose comm slot is farthest to the left.

at very low prices. Endbell free-play, air gap, stack diameter and other specifications are subject to production tolerances, which cause motors to vary to a certain degree. When you select a stock motor, look for one that has the least armature-shaft end play between the bushings. Pull the brushes and check to see whether the armature spins freely.

When the armature comes to rest, look through the brush-hood opening, and check to see where the commutator slot is positioned. When the commutator is pressed onto the armature shaft, minor differences in quality control can cause one motor's timing to be slightly more advanced than that of another similar one. The motor whose comm slot is farthest to the left is the one you want. It has higher timing and will be faster.

SUMMARY

To win races, you need the proper combination of equipment, driving skill and, of course, luck. To increase speed, racers across the country are developing new, or re-inventing old tricks of the trade. Try these motor tips to gain that little edge in motor performance. Some might work better than others, so check the results on the track by recording lap times. Also, keep in mind that these tricks won't replace good driving and respectable equipment, but they might help you to unravel the mysteries behind your ever-elusive search for speed. ■

TRINITY[®] Evolution 10

MAGIC TRICKS "INSTANT WINNERS"

by Joel Magic Johnson[®]
current IFMAR World Champion

Yes, you too can be an instant winner and save some bucks at the same time. When we designed and planned the marketing strategies for our Evolution 10 line of cars, the goal was to get a car into the hands of every serious racer. With today's economy, we knew this would be hard, as many racers simply don't have the spare cash to buy a new car. Despite the fact that it had just won the IFMAR World Championships, and that the oval version is the fastest car ever to run the Whip, some people still insist on putting nonessentials like rent, car payments and eating above R/C car racing on their list of priorities!

For these people, and you know who you are, I present Trinity's "Instant Winners." They're the R/C car kits for people who already have cars and don't need all the common parts like ball bearings, tires, body posts, diff axles, gears and hubs. I mean, if you already have these parts, why buy them again? We're not going to force you to if you want to run our cars. We always try to think of the weekend warriors who have to go all week without lunch to pay for their R/C goodies. If you're already racing, the parts we left out of these kits are already in your box or on your old car.

So now all you need is one of our Instant Winner kits to turn your RC10L or RC10L superspeedway car into the latest, hottest, 1/10-scale car in R/C—the EV10!

We offer up Instant Winners three ways:

EV0001 "Instant Winner EV10 Road Conversion." This will convert your Associated RC10L to an Evolution 10.

EV0002 "Instant Winner EV10ss Superspeedway Conversion." This will convert your Associated 10LSS into an Evolution 10ss.

EV0003 "Instant Winner Wide Oval Conversion." This kit will change your Associated 10LSS into a wide oval car. This is an ideal setup for short, tight, flat tracks where a lot of offset left weight is required.

So get yourself a killer car and save a few bucks. And, with some of that money you save, you can buy me lunch at the next big race!

Until next time,
Joel Magic Johnson[®]

ADVERTISEMENT



MRC

Baja

by WALLY CAHILL

KING



RING! RING! "HELLO?" The voice at the other end of the line was spewing out information so fast that it was hard to make out what he was saying.

"Doogie, slow down, dude. Who's coming to my house? The Baja King? Who's that? A Mexican Elvis impersonator? Ohhh, the MRC Baja King." Whew, that was close. I thought I might have to clean the house if royalty was coming.

The UPS man greeted me with his usual high-speed broad slide and tossed the box out with one hand while he steered clear of my two guard dogs and grabbed for the next gear with the other.


ANATOMY OF A KING

After I read the assembly instructions twice to make sure that all was clear, I sat down to create "El King."



Desert destroyer!





The channelled aluminum chassis is the one that's used on all three World Scale vehicles. It's extremely rigid, yet it's still lean in the weight department. MRC's* engineers had a great idea for the battery box; you can configure for 7-cell stick or hump-pack batteries.

Moving up front, you'll find a pair of mongo arms that look like they should belong to Arnold—not to an R/C truck. These bad boys are reinforced with channels on the upper side for strength, but these channels might also be a place for mud or crud to hitch a ride when you race on a sloppy track. A huge shock tower made of fiberglass ties it all together. The turnbuckle linkages have an amazing amount of girth, but they don't have the large adjustment nut that

I've become accustomed to. Instead, the center sections of the rods are squared off to permit the wrench head to grab.

The dual steering-servo mount with built-in servo-savers is a really neat feature. I really wonder if you need two servos to steer this truck. With aluminum deck posts secured to the chassis and brass outer sleeves that rotate on the posts, the bellcrank steering assembly has a bearing-like feel to it. The next step was the diff.



More size for more bashing. Throw in a few choice ingredients, such as a couple of budget modifieds, a hot ESC and a 10-cell pack, and you have the recipe for some radical off-road fun!

STUMP-PULLING POWER

When you look at the transmission parts bag, you might think that you're looking at gears from your grandfather's John Deere tractor. The Power Command transmission is this truck's hot ticket. The three 32-pitch gears have about twice the gear surface area as the 1/10-scale gearboxes that I've worked with. The ball diff and the slipper clutch are highlights, with Rulon disks that are keyed to the spur gear to prevent extra slippage.

BAJA'S BIG BROTHER

The MRC Baja King is one of the burliest stadium race trucks around. It's as rough and tough as the full-size stadium trucks that it's fashioned after. What's that you say? You don't know anything about full-size, off-road, stadium racing trucks? Well, let *Car Action* school you.

Grand National Sport Trucks

(a.k.a. stadium trucks) are strictly designed for short-course stadium off-road racing. They make up one division that competes in the popular Mickey Thompson Stadium Off-Road Racing series. Top racers such as Ivan Stewart, Walker Evans, Rod Millen and Ricky Johnson bash around in their production-based, yet extensively modified trucks. The trucks cost anywhere from \$125,000 to \$200,000, and it takes roughly the same amount of cash to operate them throughout the racing season.

The trucks have a 183ci engine limit, and they can't have more than six cylinders. The engines can be highly modified, though. Weighing in at roughly 2,600 pounds, these stadium trucks can attain speeds of up to 125mph, and the most popular transmission is a 3-speed semi-automatic gearbox, which allows the drivers to bang through the gears like a manual transmission without a clutch mechanism.

Rounding out the suspension department are nitrogen-filled shocks without coil springs. The trucks' ride height is controlled by the pressurized nitrogen shocks at 300psi. Suspension travel is 13 to 20 inches. Another feature of the truck—one that often appeals to the spectators—is the removable body panels. They can be removed quite easily, so the pit crew can gain access to the vehicle. When they hit the track and start bumping fenders, though, look out! That's when the action really starts. The fiberglass body panels fly around the track as the spectators are treated to a unique "smash-up derby."



The ball diff is similar to the type used in 1/10-scale trucks; it's just bigger. MRC also had the insight to include two spur gears, which gives you the option to gear for top speed on long tracks or low-end punch on tight tracks. The motor plate is another story: it holds two motors instead of one. (This thing could get serious.)

BABY GOT BACK

The gearbox is bolted to the chassis with four 4x12mm flat-head machine screws that are countersunk so they won't get caught on rough terrain. The rear shock tower—like the front one—is made of fiberglass and offers many mounting holes. It's attached to the rear of the gearbox, and it also doubles as a part of the rear body mount. The rear arms are secured to the rear arm supports, which are attached to the chassis with two 4x12mm flat-head machine screws (again, countersunk for smoothness).

The dogbones and the rear turnbuckles are next. These babies look like '63 VW half-shafts. Now that the gearbox is hooked to the hubs, it's a great time to think about keeping all that power on the ground. MRC didn't miss the boat here, either; it has supplied four shocks that are bigger versions of the ones we're all used to. To ensure that they work well, MRC has included metal bodies, three sets of pistons for tunability and springs that seem well up to the task of keeping the tires stuck to the dirt.

MRC BAJA KING

DIMENSIONS:

Overall length 21 in.
Width 15 in.
Wheelbase 14 in.
Track (f/r) 12 in.

WEIGHT:

Gross (with batteries) 8 lb., 6 oz.



CHASSIS:

Type Channelled plate
Material Aluminum alloy

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear
Differential Ball
Bearings/bushings Bearings

SUSPENSION:

Type (f/r) Single A-arm/upper
camber link
Damping (f/r) Oil-filled,
coil-over shocks

WHEELS:

Type One-piece
Dimensions (DxW) 5.5x2.875 in.

TIRES:

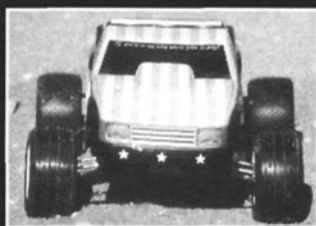
Front/rear MRC Monster Truck

ELECTRICS:

Motor Two 05/540
Battery Not included
Speed controller 3-step mechanical

OPTIONS TESTED:

Two Trinity Monster Horsepower Outlaw
Stock motors and 1700 SCRC 10-cell
pack; Novak 610RV, Tekin mini AM
receiver, Futaba Magnum 2PD AM radio.



Hits

- Giant size
- Crosses grass and gravel with ease
- Over-engineered for durability
- Full ball bearings
- Detailed instructions
- Tougher than a pit bull

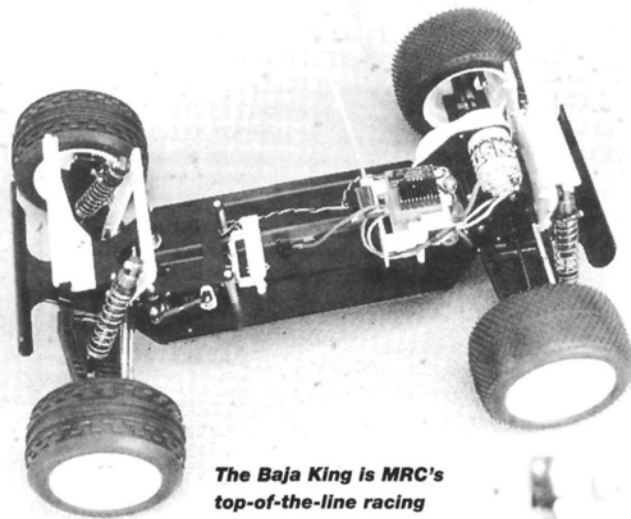
Misses

- Front upper motor screw hard to reach
- Somewhat heavy

BAJA KING



MRC uses an extremely rigid chassis that should last a lifetime. If you do happen to damage this chassis, I'd hate to drive in a full-size car with you!



The Baja King is MRC's top-of-the-line racing truck. It's the only one in their lineup that comes with ball bearings in the tranny and at each wheel.

POWER TO THE PEOPLE

At this point, it's time for the electrics to be installed. The instructions call for a mechanical speed controller, which is not included in this kit. (The kit is also available

with motors and a

speed controller.) I

chose a Novak*

610RV. My trusty

Futaba* 2PD AM

Magnum radio sent the com-

mands to the Tekin* mini-

receiver. To keep things

rolling along smoothly, the

Baja King comes with full ball

bearings on all four corners.

Just to be on the safe side

"steeringwise," I used a

Futaba 9301 servo.

I chose two Trinity*

Monster Horsepower Jr.

motors to help the King tackle

the rough stuff. This truck

weighs more than a 1/10-scale

truck, and to ensure that it

would be overpowered (just

how I like my trucks), I built

two 10-cell Sanyo 1700 SCRC

battery packs, although all

that's required is a 7-cell sub-

C pack. [Editor's note: before

following in Wally's footsteps,

be sure that your ESC is capa-

ble of handling the extra

power of a 10-cell pack, or it

could become damaged.]

LET'S TEST

Living in L.A. has its pros and

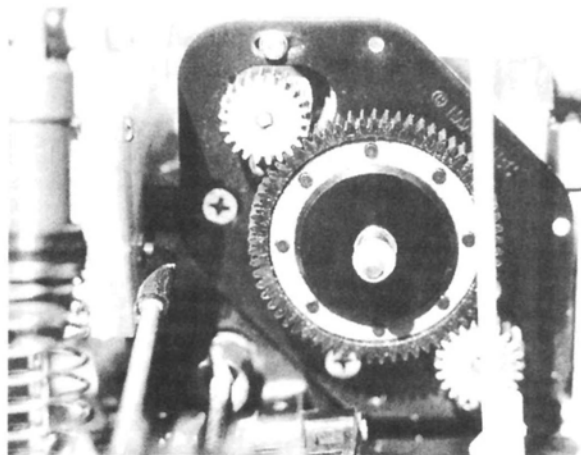
cons. One of the pros is that

we're about two hours from

Mexico. A couple of my pals

were going down to test-run their sections of the infamous Baja 500 course for the race in June. This seemed to me to be the perfect testing ground. After all, it is the Baja King.

With our patriotic-theme body from Motion Graphics* in tow, we headed for Mexico. While we set up camp, I brought out the King for a shake-down run. The truck surprised me; it was very nimble in turns and very stable in the rocky, sandy desert.



The only problem I had with the tranny setup was obtaining access to the front motor's top motor screw. Every time you want to get to it, you have to remove the spur gear.

The large tires are a big plus for running on sand and for rolling over small holes that would swallow smaller R/C vehicles.

The motors put out more than enough power. I'm sure that the 10 cells packed in the belly of this truck didn't hurt either. If you think that you might choose a similar setup, watch closely for heat buildup in the batteries and motors.

After a full weekend of nonstop running, everyone was impressed with the Baja King: it's really tough and durable, but it isn't too much of a heavyweight. It was jumped, rolled, endo'd and even attacked by one of the dogs that was with us, and it came out almost unscathed. Of the three World Scale vehicles, the Baja King is the most serious racer. It corners hard and allows you to drive a tight line, even on tracks designed for smaller, 1/10-scale cars and trucks. Because it has full ball bearings throughout, the Baja King is ready to handle the desert and the track without upgrades. MRC has hit the nail on the head with this truck!

*Here are the addresses of the companies mentioned in this article:

MRC, 200 Carter Dr., Edison, NJ 08817; (908) 248-0400.

Novak Electronics Inc., 18910 Teller Ave., Irvine, CA

92715; (714) 833-1343.

Futaba Corp., 4 Studebaker, Irvine, CA 92718; (714) 455-

9888.

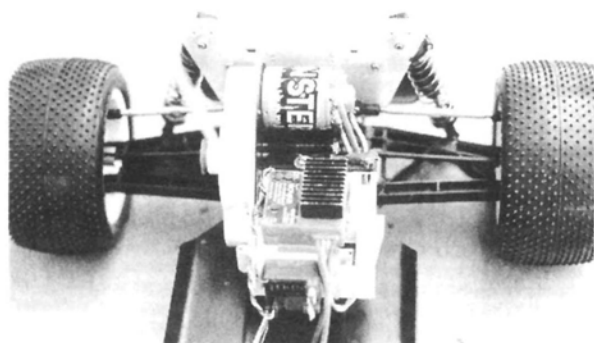
Tekin Electronics, 940 Calle Negocio, Suite 140, San

Clemente, CA 92672; (714) 498-9518.

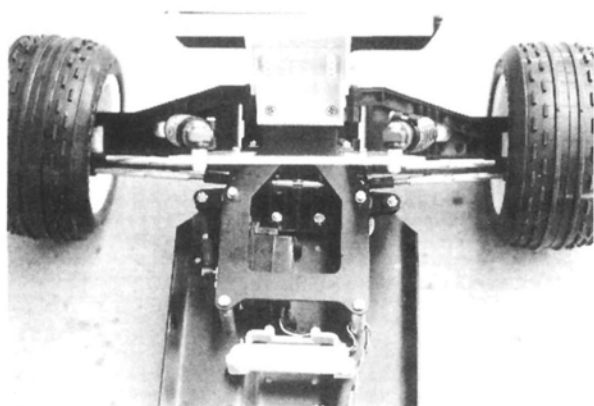
Trinity Products Inc., 1901 E. Linden Ave., #8, Linden, NJ

07036; (908) 862-1705.

Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157; (410) 848-0008.



The Baja King is the only World Scale vehicle that doesn't come with an ESC or motors. This is a plus for those who want to add more high-performance "go-power." I installed a pair of Trinity Monster Horsepower stock motors to increase the punch; handling the electronic duties are a Novak 610RV and a Tekin mini AM receiver.



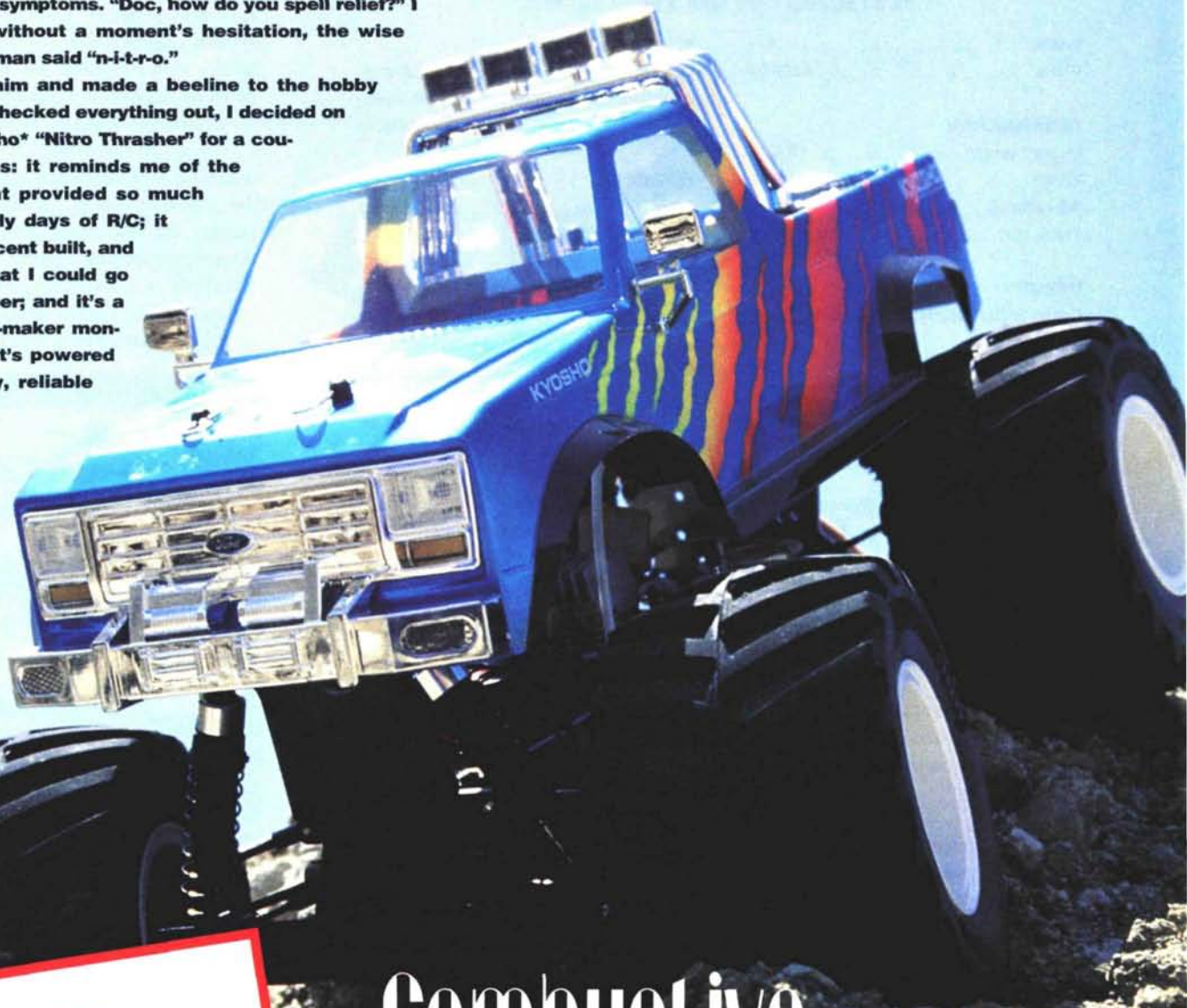
A Futaba 9301 servo handles the steering chores. The front end is extremely burly, and it should withstand the gnarliest of crashes.



by LOU MARCIELLA

S CRCs, SCRs, SCEs, SCs, peak-charge, thermal-charge, linear, pulse, discharge, amps, volts...aaaaaaaaarrrrrrgggggghhhhhh! I was having Ni-Cd nightmares again! Quickly, I called my friend Doctor R.C. Funstuff and described my symptoms. "Doc, how do you spell relief?" I asked. And, without a moment's hesitation, the wise old mountain man said "n-i-t-r-o."

I thanked him and made a beeline to the hobby shop. After I checked everything out, I decided on the new Kyosho* "Nitro Thrasher" for a couple of reasons: it reminds me of the Big Brute that provided so much fun in my early days of R/C; it comes 80-percent built, and that meant that I could go and play sooner; and it's a 4WD mayhem-maker monster truck that's powered by the mighty, reliable O.S. .12 CZ-R!



Combustive
climber

KYOSHO

NITRO
Thrasher





KYOSHO NITRO THRASHER

Scale1/10
Price\$459.95

DIMENSIONS:

Overall length17.5 in.
Width12.5 in.
Wheelbase10.5 in.
Track (f/r)6.3125 in.

WEIGHT:

Gross (with battery)5 lb., 12 oz.

CHASSIS:

TypeFlat pan
MaterialAluminum

DRIVE TRAIN:

TypeShaft/belt drive
PrimaryPinion/spur
TransmissionGear
DifferentialsBevel gear
Bearings/bushingsBushings

HITS

- Comes 80-percent assembled.
- Easy to set up and run.
- Beautifully detailed body.

MISSES

- No ball bearings.
- Lacks dirt shields.
- Servo-saver could be improved to eliminate excessive steering play.

SUSPENSION:

Type (f/r)Independent A-arm
Damping (f/r)Oil-filled,
coil-over shocks

WHEELS:

Type (f/r)Plastic
Dimensions (DxW)2.5x3 in.

TIRES:

Front/rearSemi-pneumatic V-tread

POWERPLANT:

EngineO.S. .12 CZ-R
PipeMuffler
CarbRotary

OPTIONS TESTED:

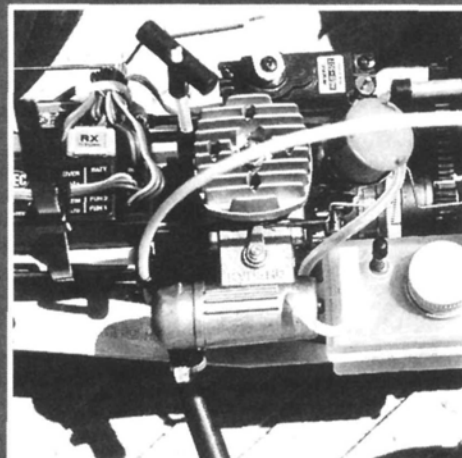
JR Alpina PCM 2-channel pistol-grip
radio with standard 407 servos



by way of shaft drive. The final connection to the diffs is provided by Kevlar-reinforced pulley belts. This setup reduces vibration from the engine/shaft and protects the gear-boxes from the elements.

Will the belts stretch? I think you can expect them to last for a long time, because Kyosho's expertise with this type of drive system is substantial. A sealed brake unit works with the throttle servo and clamps down on the shaft to bring this beast to a tire-screaming halt when necessary.

To ensure the utmost in toughness and reliability, the remaining chassis parts, i.e., the gearbox housings, the shocks, the front bumper, the suspension arms and the various mounting/support posts are made of Kyosho's exclusive Kelron and glass-filled nylon. An aluminum upper tray provides adequate space for a receiver, an on/off



Here's an overhead view of the Nitro Thrasher's layout. A spur gear drives a shaft that drives the front and rear wheels.

Before I hit the workbench, I spent some time going over the instructions. Kyosho has always produced good manuals, and the Thrasher's includes hop-up tips, helpful hints and an excellent exploded diagram of the entire kit. I then turned my attention to the chassis for a thorough inspection. Kyosho's engineers have used many of the state-of-the-art features found on their massive USA-1

Nitro Crusher; the Nitro Thrasher isn't a cosmetic makeover of the now-defunct Nitro Brute!

A brushed-aluminum chassis holds all the necessary mechanics, protects the mid-mounted motor and acts as a heat sink. A large spur gear meshes with the pinion that's mounted on the clutch/endbell and delivers power to the front and rear gear differentials

switch and a battery pack to power the receiver (no ESC, remember?).

Topping it all off is 29,000rpm of ground-pounding ponies from the O.S. CZ-R engine. This thirsty fella is fed by a large-capacity fuel tank that's equipped with a built-in primer for very easy starting! A tube runs from the muffler to the tank to generate pressure and keep the fuel flowing.

HELPFUL HINTS TO KEEP YOUR THRASHER BASHIN'

Today's gas-powered vehicles are more fun and more reliable than ever before, but that doesn't mean that you should neglect them come maintenance time. Follow these tips, and your Nitro Thrasher will always be ready to roar when you want it to.

• Break-in the engine and maintain correct operating temperature.

• Clean and oil the filter after every three to five runs (more often if your track is dusty).

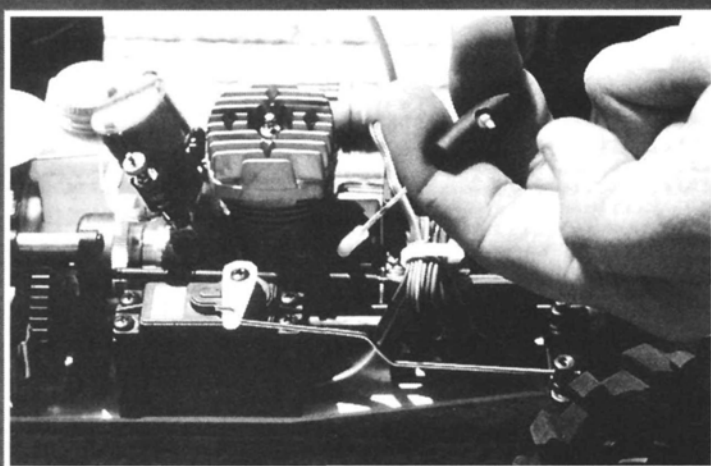
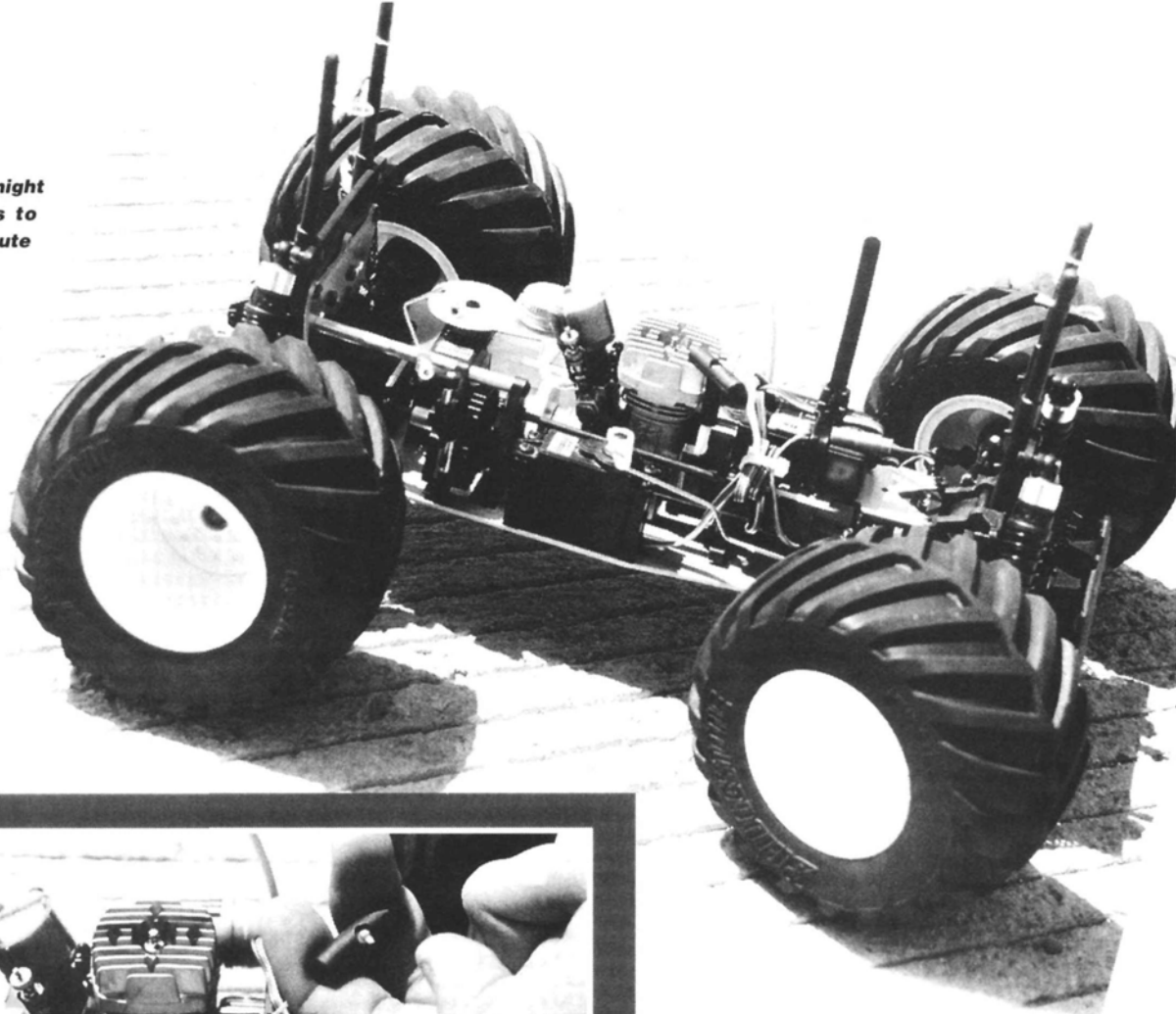
• Use fuel that's blended for car engines only.

• Keep the fuel tank clean and

Simplistic, yet sano! You might want to make dirt shields to protect the inside of the brute from flying dirt.

To get the Nitro Thrasher going, all you have to do is mount the front and rear suspension components, finish off the drive system, bolt on the wheels and tires and paint the beautiful Ford F-250 Lexan body. Kyosho has done most of the work for you, so do the rest carefully.

I bolted the two-piece rims



A quick tug on the pull-starter fires up the powerful O.S. CZ-R .12 engine. Kyosho included a glow igniter and a fuel bottle in the kit—a nice bonus.

together, and I highly recommend that you follow the tip in the manual and drill small holes in the rims to relieve pressure in the balloon tires. If you don't like the way this setup performs, just grab some CA or epoxy and close the holes back up. I only wish that the Nitro Thrasher came with the Kyosho Double Dare's gorgeous chrome turbo wheels: oh well, sometimes life is tough,

young patriots! It was time to get the truck up and running.

Because gas-powered vehicles run so much longer (and in some cases, faster) than their electric counterparts, I didn't want to take any chances on the Thrasher getting "glitched" off course! In went a JR* Alpina PCM radio, which features "ABC&W" circuitry to snuff out interference. I'm no rock-

et scientist when it comes to explaining how this unique circuit works, but suffice it to say, it does! High-tension wires, transformers, TV/CB transmitters and other high-powered radios present no problems, and the fail-safe system prevents runaway when your receiver battery runs low. In other words, your vehicle won't end up under a moving 18-wheeler unless you drive it there!

Installing the radio, calibrating the steering/throttle/brake linkages and breaking-in the engine are the most critical steps! Follow the directions to the letter, and have someone who has nitro experience help you out if you can't get a grip on things. Even though it isn't mentioned in the manual, the Thrasher's built-in servo-saver must be tightened for proper steering response. (And please use a servo with at least 40 ounces of torque!) I found that there was excess play in the servo-saver, so I glued the sections together with CA, and steering was greatly improved.

When it was time to color this creation, I asked fellow racer Brian Copley to grace the Thrasher's Ford body with one of his patented "nuclear nightmare" paint jobs. Cool, isn't it? The detailed chrome pieces add a "concours" touch and a great deal of scale realism. Considering the abuse this machine will take when it hits the "dirt wastelands," a beater-body is definitely in order!

(Continued on page 134)

free of crud (always use a fuel-line filter).

• Use the correct glow plug for your engine (keep a few spares around, too).

• Clean the vehicle and lube the bushings after every day of running.

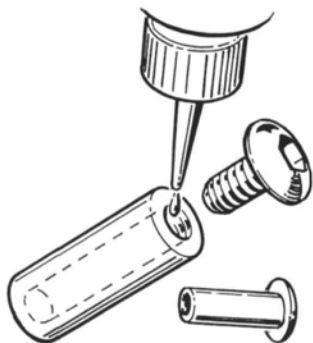
• Wrap the receiver in a balloon to prevent fuel

and moisture damage.

• Read *Radio Control Car Action* and practice safe R/C!

PIT TIPS

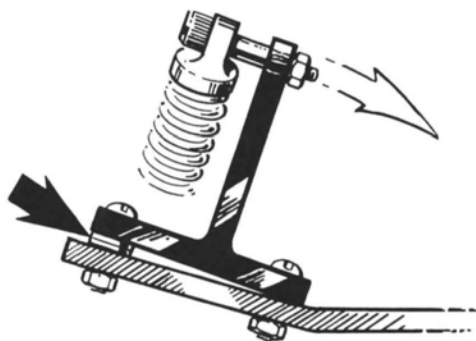
by JIM NEWMAN



LOSI EXTENDED GEARBOX COVER NUT

Cut a 1/2-inch-long segment from an old RC10 wing standoff, and thread the center with a 4-40 tap. Using CA, glue a 4-40 screw into the top of the tube. Now, rather than removing the right shock, you can access the cover screw using this extension and an Allen wrench.

Gary Bain, Cleveland, TN



JR-X2 CASTER ADJUSTMENT

You can change the front rake/caster of the JR-X2 by inserting washers under the front shock tower. (It works particularly well on older models.) This will make the shock towers lean backward and increase the amount of caster to the front wheels.

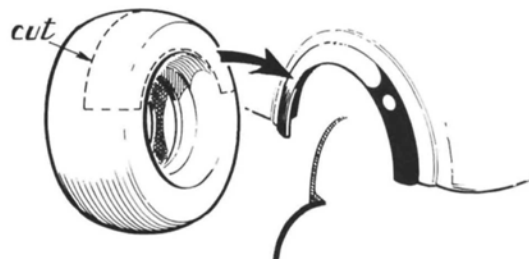
Skip Furrer, W. Yarmouth, MA



SPARE PINION CADDY

Don't discard the plastic box that contains new servos. Line it with foam, then use a hot tube to create a hole for each pinion. Write the number of pinion teeth by each hole using a permanent marker or stick-on numbers.

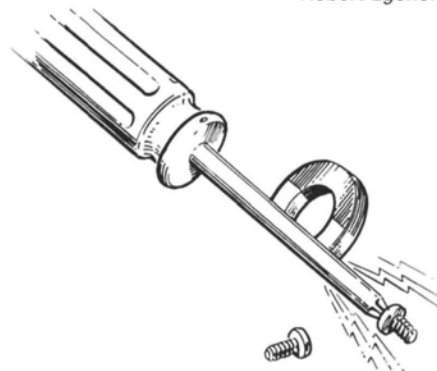
Tay Eng Sion, Singapore



FLARED FENDERS FOR PUMPKIN

Cut a segment out of an old, smooth tire, (shown by the dotted line); then glue the segment under a fender. These flares deflect water away from the truck.

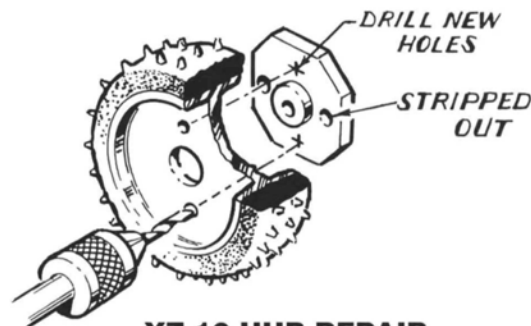
Robert Egenolf, Freehold, NJ



MAGNETIC SCREWDRIVER

You can magnetize your screwdriver by attaching a magnet as shown. Now you won't drop screws into the recesses of your car.

Kelly Pham, Honolulu, HI

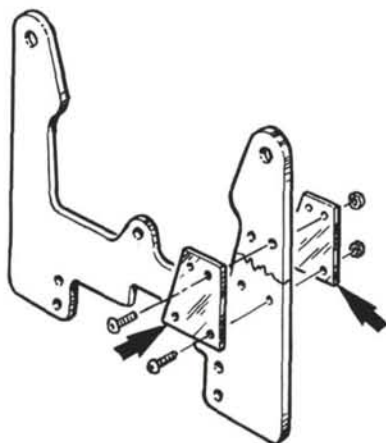


YZ-10 HUB REPAIR

If the threads of your hub carriers are stripped, just rotate the wheels 90 degrees, and drill new 3/32-inch (2mm) holes through the carriers for the screws.

Jeff Bronleewe, Austin, TX

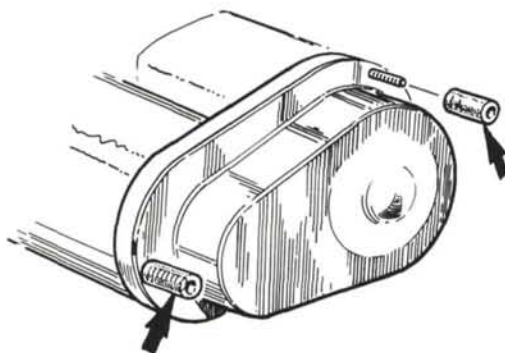
PLEASE NOTE: be sure to print your name and full address clearly on every letter and sketch you send to "Pit Tips." We have to throw away many good tips because we don't have the senders' names or addresses.



SHOCK TOWER REPAIR

If a shock tower snaps off, glue the broken pieces together, then screw 1/32-inch (1mm) aluminum plates onto each side of the fracture using nuts and screws.

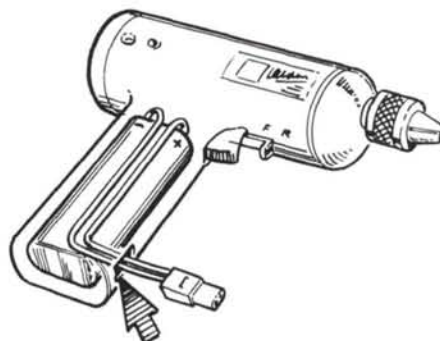
Tang Peng Yeen, Johor Bahru, Malaysia



REMOVABLE COVER

Instead of using screws to secure your gearbox cover, push tight-fitting lengths of rubber fuel tubing over the screws. You'll be able to access your gearbox quickly.

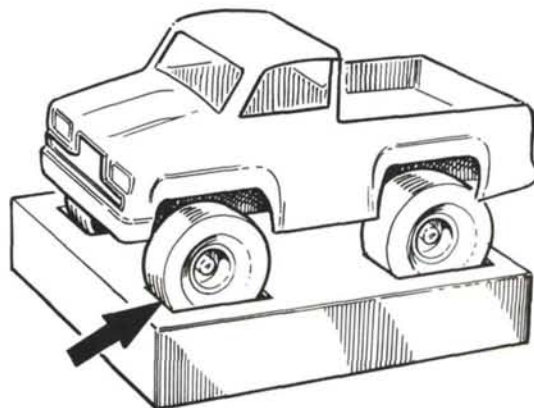
Gary Vreeland, Wichita, KS



PEAK-CHARGE YOUR DRILL

Cut a slot into the grip of your cordless screwdriver or drill, glue in a Tamiya connector (or whichever you use), and wire it directly to the battery pack as shown. Now you can use your car's peak-charger (set at 1 amp) to charge your tools. (Before you charge your tools, make sure they are equipped with Ni-Cd batteries only.) Use light bulbs to discharge them properly.

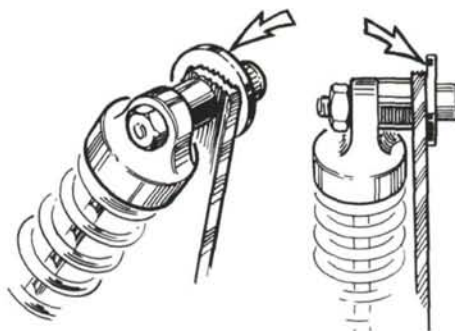
Christopher Drouin, APO



CAR OR TRUCK CHOCKS

Cut four rectangular slots in a cardboard box; then set the wheels in the slots so that your vehicle won't move while you work on it.

Chris Janes, Shafter, CA



SHOCK-TOWER PROTECTION

After rolling his Ultima a few times, this car owner noticed that the tops of the fiberglass towers were wearing away. To prevent further damage, he added large steel washers. Now the car skids along on the steel washers.

Michael Rogers, Aurora, CO

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd. Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

by GEORGE GONZALEZ

IT'S AMAZING HOW much off-road racing technology has evolved. Just a few years ago, even the most sophisticated off-road R/C cars needed a multitude of after-market parts to remain competitive. It's no wonder that companies specializing in R/C after-market hop-up parts sprang up like weeds.

The engineers at Traxxas[®] had one thing in mind when they designed the next generation of the Blue Eagle LS: to offer an affordable, high-performance, off-road racing truck that didn't need any after-market parts to win races.

TRAXXAS

LS-II

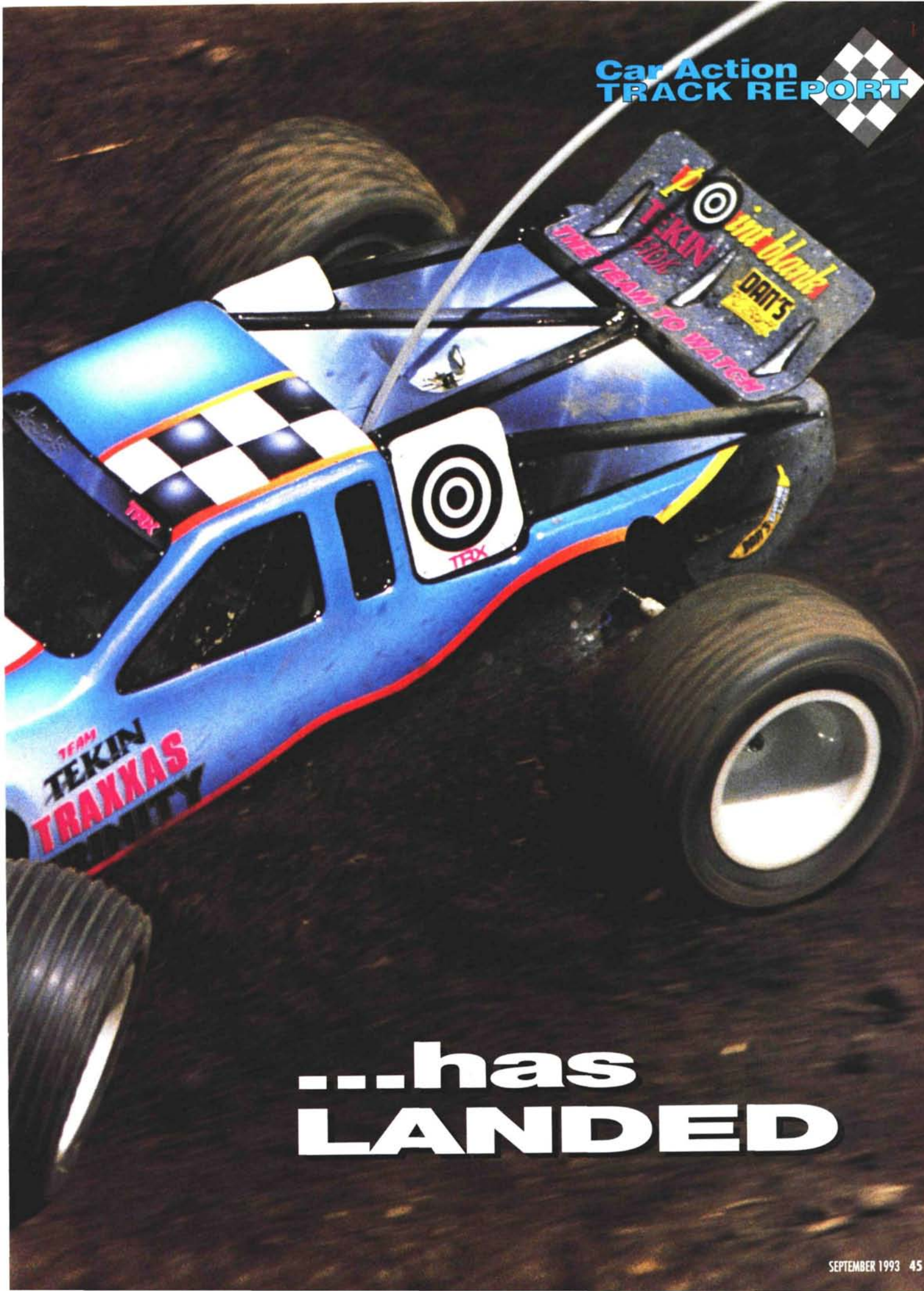
With a little practice, you can get to the winners' circle with the LS-II without spending a dime on hop-ups. At the Texas State Championships, Scott Rister won in the Modified and Stock classes, and he TQ'd in both. At the Georgia State Championships, John Walters took home the trophy in the Modified Class. Not bad, considering that they were using box-stock LS-IIs.

The new LS-II is a true thoroughbred racing truck—not a racing-buggy-gone-racing-truck conversion. In fact, if you compare the LS-II with the new Traxxas TRX-3 racing buggy, you'll find that they're two completely different racing machines. It's hard to believe that, with so many new upgrades, the LS-II carries the same price tag as the original LS.

PHOTOS BY WALLY CAHILL

The eagle...





...has
LANDED

ULTIMATE CHASSIS

The LS-II's new Zero-Flex chassis is one of the most rigid 1/10-scale, off-road, racing-truck chassis on the planet. It uses the LS's narrow graphite plate with 30 degrees of front rake; for increased stiffness, it has a fiberglass upper plate. The upper plate is secured to the front bulkhead, the steering bellcrank and the battery box with 14 screws—talk about secure! Also, it has a rectangular opening that allows adequate steering-arm clearance.

The LS-II's new battery box also increases the rigidity of the chassis. It has full side walls that provide longitudinal support; they act as the "backbone" of the chassis. The box holds the battery firmly in place, and it will accept most 6-cell packs and 7-cell hump packs.

SAVVY SUSPENSION

Up front, the LS-II uses the narrow bulkhead/long A-arm suspension with inboard pivot points that was used on the LS, but Traxxas has developed a new, stiffer, extremely rugged material for the A-arms, the A-arm mounts, and the caster and steering blocks.

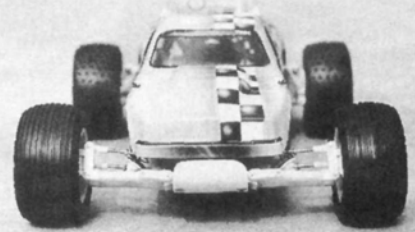
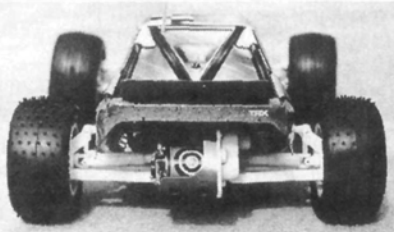
The LS-II comes with a set of long, hard-anodized, Teflon-coated shocks like those found on the Blue Eagle LS. They have double O-rings with translucent seals and rubber diaphragms within the shock caps for leak-free, ultra-smooth operation. They're also easy to assemble and maintain.

The kit includes a variety of shock pistons for precise shock tuning, and a set of Pro Series, black, stainless-steel springs for the front shocks. I used Associated* 25W pure silicone oil, and I installed the single-hole shock pistons. The shocks are mounted on a black fiberglass shock tower that has a multitude of shock and camber-rod mounting holes. A nylon body mount that doubles as a shock-tower brace is secured to the front shock tower.

The LS-II uses a new steering-bellcrank system that's specifically designed for its suspension geometry. The bellcranks are supported by aluminum posts that are attached to the chassis and the fiberglass upper plate. A tie rod with hollow ball connectors holds the two bellcranks together, and this provides slop-free operation. You can upgrade the system with ball bearings at any point—just replace the bronze bushings with bearings. If I hadn't had bearings of the right size in my toolbox, I would have been perfectly satisfied with the stock bushings; their action is extremely smooth.

The LS-II comes with a complete set of adjustable turnbuckles with new, flared, hollow ball connectors that allow easy trackside toe-in/toe-out and camber adjustment. The new ball connectors fit more tightly and are

TRAXXAS LS-II



Scale 1/10
Price \$335

Dimensions:

Overall length 18.25 in.
Width 12.25 in.
Wheelbase 11.5 in.
Front track 10 in.
Rear track 10.25 in.

Weight:

Gross
(with battery) 3 lb., 15 oz.

Chassis:

Type Double-deck plate
Material Graphite (lower);
fiberglass (upper)

Body:

Type Stadium truck
Material Polycarbonate

Drive Train:

Primary Pinion/spur
Transmission 3-gear
(output ratio 2.72:1)
Differential Ball diff
Bearings/bushings Bearings

Suspension:

Type (f/r) Lower A-arm,
upper camber-link
Damping (f/r) Oil-filled,
coil-over shocks

Wheels:

Type (f/r) One-piece dish
Dimensions (DxW) 2.2x2 in.

Tires:

Front Pro Trax 4780
multi-rib
Rear Pro Trax 4790
6-row spike

Electrics:

Motor, battery,
speed controller Not Included

OPTIONS TESTED:

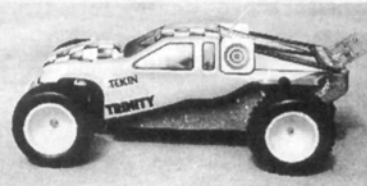
Airtronics XL-2P radio, 75-band receiver and 94152 high-torque/high-speed ball-bearing servo; Tekin 410K ESC; Point Blank matched 7-cell Sanyo 1700 SCRC battery pack and 11-turn, triple-wind, modified motor; Litespeed heat sink; Kimbrough* servo-saver.

HITS:

- Race ready—right out of the box.
- Super-rigid Zero-Flex double-deck chassis.
- Hard-anodized, Teflon-coated shock bodies.
- Super-trick battery box with reinforcing side walls.
- Ultra-smooth, ball-bearing-adaptable steering bellcrank.
- Super-low final-drive ratio.
- Adjustable turnbuckles with ball connectors.
- Cool-looking and functional new body.
- Excellent instruction booklet.

MISSES:

- Battery box secures battery pack firmly, but the only way to remove the pack is by tugging on the wires.

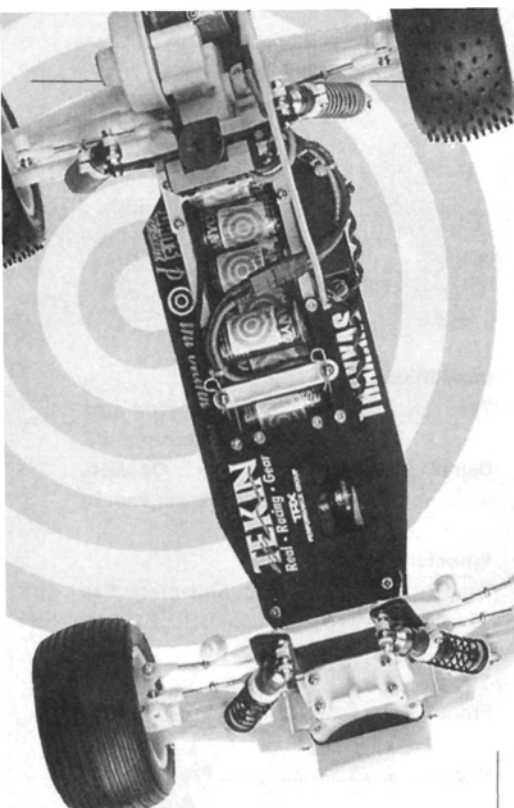


easier to use than the originals; no washers are required. You can increase or decrease the front rake in 1.5- and 3-degree increments by adding nylon wedges between the chassis and the front A-arm mounts.

REARVIEW MIRROR

In the rear, the LS-II has extra-long suspen-

sion arms with inboard pivot points, axle carriers and A-arm mounts: all are made of the new, stiff material. It also has a longer version of the hard-anodized, Teflon-coated bouncers that are used up front. The supplied blue springs work extremely well on all track conditions. I used the single-hole pistons and filled the shocks with 25W silicone oil.



TRAXXAS LS-II

and long run times. It also allows you to use smaller spur gears (fewer teeth) and taller pinion gears (more teeth): this provides a better gear mesh, and it also allows you to install the motor more toward the front. This, according to Traxxas, increases steering and forward traction.

The LS-II's tranny is the simple three-gear design, and it uses Traxxas Pro Series black gears for improved performance and reliability. The top gear is made of steel, and it's secured to the top shaft with a roll pin for slip-free operation. The excellent ball diff uses 12 $\frac{3}{32}$ -inch hardened diff balls and a set of notched diff rings. The diff assembly is secured by the diff shaft, which uses a very trick, beveled thrust-washer assembly and is supported by two ball bearings. To adjust the diff, insert an Allen wrench through the opening in the tranny case and into the left diff hub. Rotate the right wheel forward to tighten the diff and backward to loosen it (no disassembly required). The completed ball diff is extremely smooth and can handle the hottest of modified motors.

The LS-II uses the TRX-3's slipper-clutch system. Six Rulon pegs are installed in the holes in the spur gear, and the spur gear is installed on the top shaft between two slipper rings. Slip is regulated by the tension setting on the locknut and coil-spring assembly. The kit includes a 78- and an 84-tooth spur gear,

the ground throughout the A-arms' operating radius.

RADICAL RIMMAGE

The LS-II uses a very cool-looking set of deep-cone dish wheels. They're functional, too: their design improves aerodynamics and repels dirt. The inside of each wheel is deeply offset, and this allows the front steering blocks and the rear axle carriers to sit well inside it to reduce wheel scrub.

In the rear, a set of Pro Trax 4790 medium-compound spike tires are included, and they



Extra-long A-arms in the rear help the truck to handle the roughest tracks. The new, stiffer material is used not only on the rear arms, but also in the axle carriers and the A-arm mounts. Rear toe-in and anti-squat are completely adjustable.

Here's a view of the completed Traxxas LS-II. It's a totally refined racing truck, yet it has the same price tag as its predecessor, the Blue Eagle LS.

As in the front, a black fiberglass shock tower is used; it has several pre-drilled shock mounting holes, and it doubles as a body mount. The rear bulkhead holds the tranny, the battery box and the shock tower, and it offers a variety of camber-rod mounting positions. A set of adjustable turnbuckles with flared, hollow ball connectors (like those up front) is included.

Rear toe-in and anti-squat (rear-end caster) are completely adjustable. The A-arms come with 3 degrees of toe-in built-in, and depending on which A-arm mounts you use, and how you install them, you can increase or decrease the rear toe-in.

Anti-squat is adjusted by installing nylon wedges between the chassis and the A-arm mounts. I installed the 1-degree A-arm mounts backward to reduce the rear toe-in to 2 degrees, and I installed the 3-degree nylon wedges between the chassis and A-arm mounts for a total of 3 degrees of anti-squat.

TOTALLY TRICK TRANNY

The LS-II is equipped with a racing tranny that's designed specifically to be used with the larger-diameter racing-truck tires. The tranny's super-low 2.72:1 final-drive ratio provides smooth acceleration, fast top speeds



Enter the new LS-II! Updates to the front end include new A-arms made of a stiffer, more rugged material; A-arm mounts; and caster and steering blocks. The new caster and steering blocks are based on an entirely new steering-bell-crank design.

and this seemed odd at first (these are the same spur gears I use in my buggies with smaller-diameter tires), but after some calculating with the super-low final-drive ratio, they seem to be the perfect combination. The kit also includes a set of extra-long universal sliders that smoothly transfers the power to

work extremely well on medium to loose dirt. On hard-packed dirt, you can cut down the spikes to provide more surface to the ground and to increase traction. Up front, a set of 4780 medium-compound, 12-row, mini-ribbed tires are used; they seem to work well on any surface.

BODACIOUS BOD

At first glance, the LS-II's new body might seem to have undergone only subtle changes. After close examination, however, you'll see that the changes are monumental. The new body is even narrower and lower than the original. The most significant change is the rear wheel wells: you remove just enough of the rear body material to allow for for camber-rod clearance—and that's it. The wells are flared to cover the contour of the rear shocks to keep them free of dirt. This system really works; after each run, the flared wheel wells were packed with dirt, but the shocks were clean as a whistle. The new body also includes a very trick wing that has three ribs for extra strength.

(Continued on page 88)

40 Bolt-Ons UNDER \$20

Is your need for speed driving you into the hobby shop and driving your money out into the ozone layer? Is your desire to impress depressing your bank balance? Believe us, we know what you're going through. We scoured the circuit for news of bitchin' bolt-ons that won't put you in hock up to your hub caps. Read on!

Cheap tricks!



Shock Springs

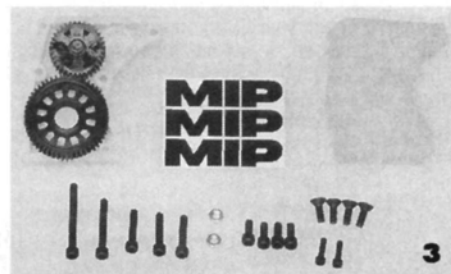
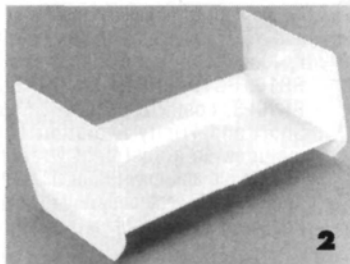
Suspension springs are some of the most important—and least expensive—tuning aids in off-road racing. Team Losi offers an unmatched selection of precision coil springs. These brilliantly painted, color-coded springs are made of mil-spec materials to exacting standards. On each spring, both ends are ground flat to ensure superior, consistent, predictable performance. The Team Losi springs are available in lengths of 1.5, 2 and 3 inches in numerous convenient rates, and they fit most shock absorbers.

Part nos.—5100 through 5160;
prices—\$2 to \$2.50.

Tough Wings

These strong, Associated molded-plastic wings provide all the down-force you need, and unlike Lexan wings, they won't break or warp.

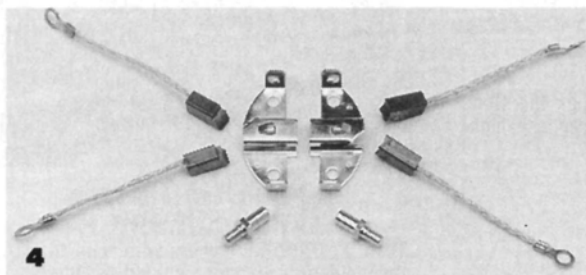
Part nos.—6110 (neon pink); 6111 (black); 6112 (white); 6113 (neon green); 6114 (red); **price**—\$5.



Change Box Kit for RC10 & RC10T

Here's a new option in gear ratios for the Associated RC10 and RC10T. Use this kit to give the Stealth Tranny a 2.61 ratio, which offers smoother acceleration with less tire spin, and smoother deceleration with greater stability and steering. It also allows longer run times and keeps motors cooler. Designed for trucks, the MIP Change Box kit also works well in stock and modified buggies. The kit comes with an MIP tranny case, a diff and idler change gears.

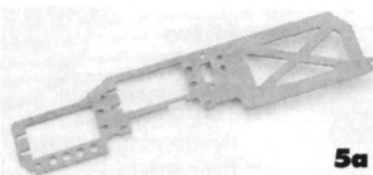
Part no.—AS-1000; **price**—\$17.95.



Lay-Down Brush Kit

Trinity's hard-compound motor brushes have the correct radius for easy break-in, wrap farther around the commutator to give more power and, when a timed brush is used, they increase timing even more. The Lay-Down Kit includes hoods, screws, posts and a pair of timed brushes and full brushes.

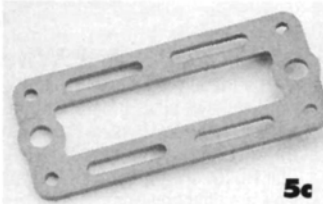
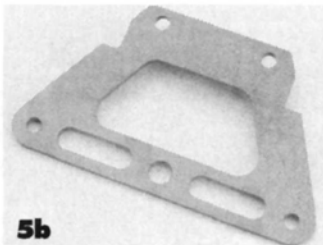
Part no.—RC4471; **price**—\$16.

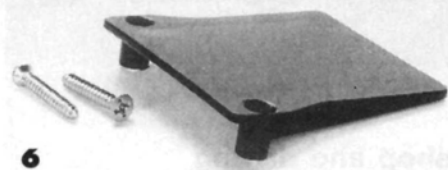


Graphite Inferno Parts

Designed as replacements for the original aluminum parts on the Kyosho Inferno, this light graphite radio plate, front brace and brake support from Duratrax make life easy because they've been drilled for you. They're also less likely to bend than the original aluminum, so they help to stiffen the chassis.

Part nos.—DTXC2507 (radio plate), DTXC2508 (front brace), DTXC2509 (brake support); **prices**—\$19.95, \$8.95, \$6.95.





6 ESC Tray

With RPM's light, injection-molded nylon tray, you'll be able to mount your ESC horizontally on the Losi Junior chassis, so air will be able to pass through the heat sinks properly, and the chassis' center of gravity will be kept low.
Part no.—7365; **price**—\$4.95.



9 Wide Foam Bumper

The lightness of TRC's wide foam bumper allows racers to protect their vehicles during crashes and prevent body flexing at high speeds without adding a lot of weight. This bumper is designed to fit any on-road chassis, and it can be contoured to fit any body.
Part no.—215; **price**—\$8.50.

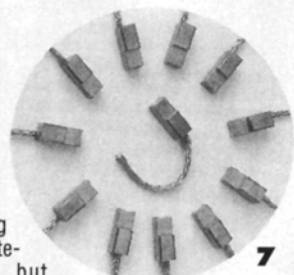


12 Deepset Superstar Wheels

Available for various models of 1/10- and 1/12-scale cars, HPI's Superstar Wheels come in white, black, yellow, pink, green, chrome and gold. The Universal truck wheels fit the JR-XT, Outlaw, Ultima, Nissan King Cab, Blackfoot, etc. The Off-Road fronts fit the RC10, JR-X2, Ultima, Triumph, TRX-1, etc. (various adapters are included). Off-Road rears fit the RC10, JR-X2, Kyosho/Tamiya with hex hub (no adapter needed). RC10T and LX-T wheels are direct bolt-ons. HPI's 2.2-inch off-road wheels fit Kyosho 4WD, RC10 and JRX (with an aluminum adapter that's available separately). The 1/12-scale On-Road wheels fit most U.S.-made direct-drive cars.
Part nos.—2170-2186; **prices**—\$6 to \$9.50.

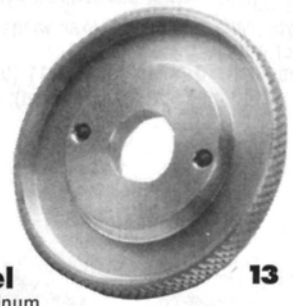
Six-Pack Brushes & Springs

If you want to have a winning edge, motor maintenance is critical, but replacing brushes and springs can be costly. With B&R's Six Packs, you get six pairs of competition-grade, silver, graphite brushes or six pairs of stainless-steel springs for as little as \$1.50 a pair.
Prices—\$8.99 (Six Pack brushes without eyelets), \$10.50 (with eyelets).



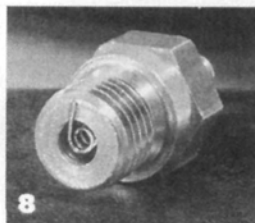
10 New Titanium Turnbuckles

R/C Performance Specialties has redesigned its titanium turnbuckles; they're now stronger and easier to adjust, and they have that "factory look." They're available in sets for the RC10, RC10T, RC12LW, RC12LS, RC10L, RC10LS, Losi Pro SE, LX-T, Mugen Super Sport and Trinity Evolution 10. Each set includes an adjustment wrench that fits RCPS's old and new turnbuckles. All sizes are now available separately and in sets.
Prices—\$3/one; \$20/set.



13 Nitro Hawk Flywheel

Thorp's aluminum flywheel for the Nitro Hawk weighs two-thirds less than the stock unit, so it offers quicker throttle response, higher revs and lower rotational mass.
Part no.—5361; **price**—\$15.

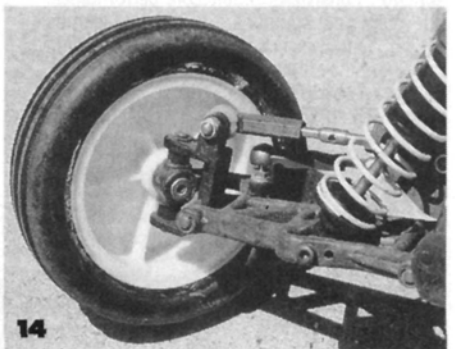


McCoy MC9 Power Plug

Stress, heat, oxidation and corrosion can distort and ruin most glow plugs. This Dynamite power plug, however, has a heavy-gauge, pure platinum element that's virtually impervious to these hazards. The element is securely welded, so you won't have to worry about it loosening. A ceramic insulator seal prevents any compression leaks that might rob your engine of power.
Part no.—2509; **price**—\$7.49/two.

Aluminum Chassis Brace

ESP's proven, one-piece reinforcing chassis brace for the Clod Buster makes the suspension system more rigid, so it increases overall strength and improves handling.
Part no.—ESP0004; **price**—\$12.95.



Pro-SE Steering Enhancement Kit

Team Losi Pro-SE owners who want to increase their steering response should try this kit from Jammin' Products. By altering the roll center and critical front-end geometry, this kit will make your Pro-SE Ultra really aggressive. The increased steering response is ideal for high-bite tracks and tight turns. The kit is inexpensive, easy to install and includes complete set-up instructions. All parts are available separately.
Part no.—J-550; **price**—\$12.95.



Special Antenna Holder

By drilling just one hole, you can mount Kyosho's Special Antenna Holder on any chassis or radio tray. Its knurled design makes it

easy to grip when you install or remove the antenna. It holds your antenna securely during races, but it also allows you to remove it easily for transportation.

Part no.—KYOC2051; price—\$8.50.

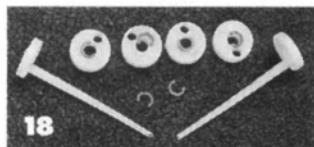
New-Style Jump Jets

With shocks, the eternal question has always been which oil?—light oil for best performance on the washboard sections of a track, or heavy oil for the large jumps? We have always had to compromise—

until now. Paragon's Jump Jets' "Variflow" has come to our rescue. As the shock com-

presses, a tapered needle passes through a hole in the piston. As more load is applied, the needle gradually restricts the flow of oil from one side of the piston to the other, so the car won't bottom out after taking a big jump. You can use lighter oil with Jump Jets, so your car will also be more stable over small bumps. Jump Jets work in Associated, Losi, Kyosho gold and other popular shocks. They can be adjusted to fit long-, medium- and short-barrel shocks.

Price—\$7.50/pair.



Battery Spine

Losing a race because your battery pack "bolted out" of your car or truck can now be a thing of the past. The durable new S&K Battery Spine can easily be snapped into any RC10 or RC10T battery box. It's easy to use, and it comes with an unconditional guarantee! Break it, run over it, solder a hole through it, and S&K will replace it—no questions asked!

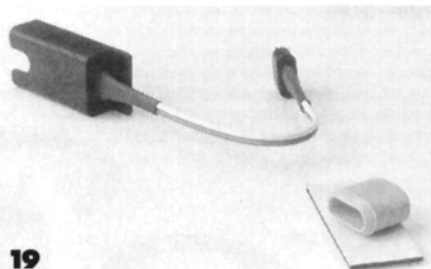
Part no.—SKBS18; price—\$5.95.



Pontiac Superspeedway Body

This true-to-scale, performance-tested, low-profile, Pro-Line '93 Pontiac superspeedway body is made of durable, clear Lexan. It has great aerodynamics, looks like the full-size car and fits the 10L and all other on-road chassis.

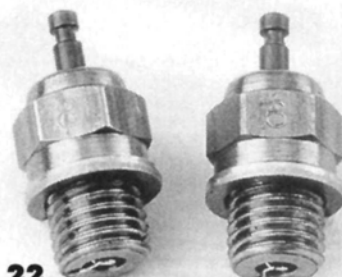
Part no.—3069; price—\$19.95.



Crystal Extension Kit

Flying Point's Crystal Extension Kit may be one of the best ideas to hit the R/C market in a long time! It can help you to protect your receiver from dirt and water while allowing you to change your crystals quickly and without hassle. Mount your crystal up to four inches away from your receiver. Independent lab test indicate that the crystal extension kit shouldn't cause range problems or interference.

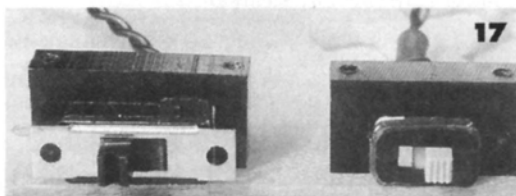
Part no.—7044; price—\$5.95.



Glow Plugs

These special Rex glow plugs are designed to be used with high-nitro fuels. Use the no. 6 plug with fuel containing up to 25 percent nitro; use the no. 8 plug with fuel containing more than 25 percent nitro.

Prices—\$5.49 (no. 6); \$6.29 (no. 8).



ESC Switch Clamp

Use this light, plastic clamp from Holeshoot to mount your ESC switch on your chassis, your shock tower—anywhere! It's great for off- and on-road racing, and vibration won't loosen it. It comes with two 2-56 flat-head screws.

Part nos.—4500 (fits Novak); 4505 (fits mini Novak); 4510 (fits Tekin); price—\$2.89.

Universal Connector Set

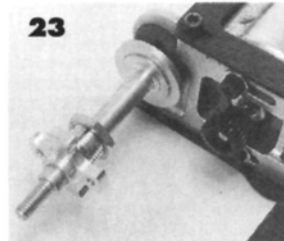
Tekin Electronics offers interchangeable housings that can be adapted to most radio systems, and they're made on a new mold, so they now fit better and are more reliable. Each set contains two Futaba/Tekin/Kyosho/JR plastic housings, one Airtronics/Sanwa housing, one KO housing and one 8-inch, three-connector ribbon cable with JST terminals on one end.

Part no.—UNV005; price—\$6.



Light Left-Wheel Collet Hub

Available for 1/12-scale and 1/10-scale cars, this new collet hub from Class Recreational



Products is the truest, most balanced, left-wheel hub on the market. A unique, 360-degree, four-jaw clamping system holds the hub on the axle—no need for harmful

setscrews that damage your expensive axle. Also, unlike hubs that clamp only on one side, this system doesn't adversely affect your vehicle's balance—no vibration and chatter at high speeds. Your left wheels will run smoothly and give the most consistent lap times.

Part no.—3001; price—\$19.95.



24

Buggy Body

Here's the newest, most aerodynamic Lexan fast-back racing bug body for the RC10T, Nitro Hawk, Clod Buster, USA-1, Stadium Blitzzer and Outlaw Raider. Dahm's Buggy fits the RC10T and the Nitro Hawk like a glove. Attach it to the side of the aluminum-tub chassis with hook-and-loop fastening and keep the dirt out! The Buggy has a chopped top, sleek racing fenders, a sunroof and a large "whale-tail" spoiler.

Part no.—D080; price—\$19.98.

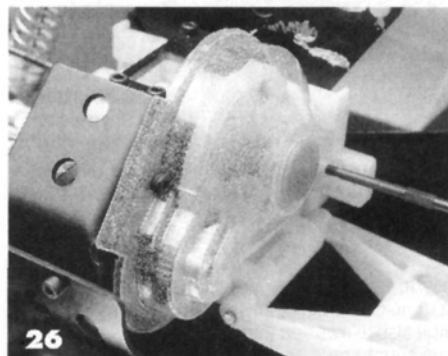


25

Tires & Wheels

Point Blank offers tires and wheels to suit every off-road track. Shown are the dash-pattern wide front tires that are great for very hard-packed clay surfaces. They fit Point Blank Bead-Lok wide front rims. Other treads for front and rear include mini-spikes, block patterns, pointed medium spikes, dual stepped-spikes and four-rib wide and narrow fronts.

Price—\$9.99.

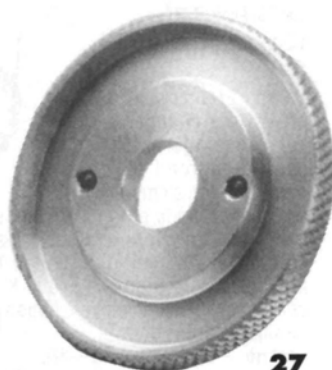


26

Stealth Tranny Gear Cover

Protect that sensitive Stealth transmission with Parma's clear Lexan cover, which is large enough for a 90-tooth spur gear. It not only provides a complete seal that prevents dirt from ruining your tranny, but it also has an access hole that allows you to make adjustments quickly and easily.

Part no.—12504; price—\$3.25.

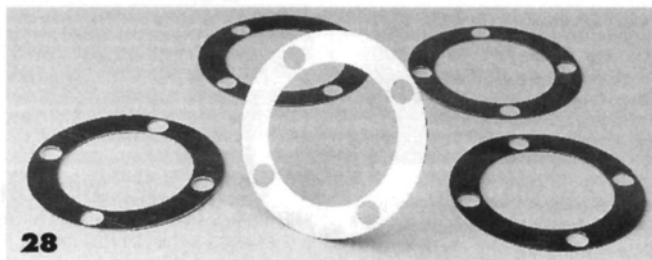


27

Flywheel for Nitro Hawk

Traxxas' aluminum flywheel for the Image .12 engine is one-third the weight of the stock steel flywheel. Less weight means lower rotational mass, and that means quicker throttle response and higher revs. Installation is easy; just bolt it on.

Part no.—3143; price—\$15.

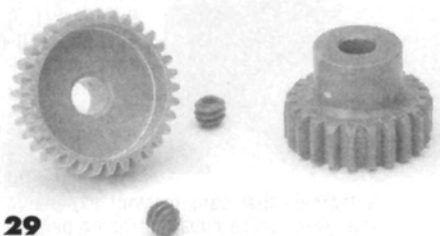


28

Conical Gear Shim

Replace the stock gear shim and tighten your Mugen tranny with this conical gear shim from Racing Jack.

Part no.—J-118; price—\$14.99.

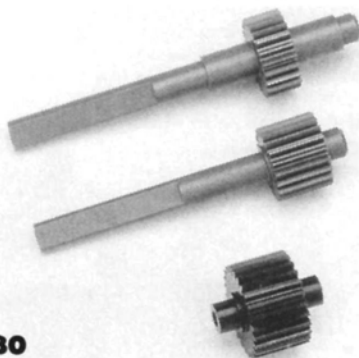


29

APC Pro Pinions

PSE has improved these light Pro Pinions with an advanced polymer coating (APC) that makes them more durable and reduces friction. They're available in several tooth sizes and in 48 and 64 pitch.

Part nos. PSE 93018-93045, 94013-94035; price—\$5.95.



30

Stealth Idler Gear

Magic Motorsports' precision-machined composite idler gears are a direct replacement for the gear in the Stealth tranny. They're keyed to the shaft so they won't separate from it. Also available are a top shaft for the Stealth tranny with Hydra slipper (MM2004) and for the Losi tranny with Hydra slipper (MM2006).

Part no.—MM2008; price—\$10.50.



31

Interceptor Body for the Traxxas TRX-1

The A&L Interceptor was designed to fit snugly on the chassis to keep out the dirt, and its molded side dams help to keep dirt off the rear shocks. Air scoops allow cool air to reach the speed controller and the motor. Each body comes with a Concept wing that's waiting for your custom paint scheme.

Part no.—9506; price—\$12.95.

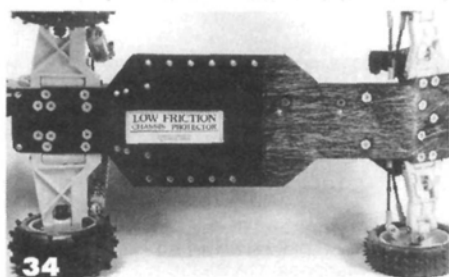


32

Ironman Toyota Pickup

This is it—the Ironman Toyota Desert Racer body from McAllister Racing. From its streamlined Baja nose to its molded-in roll bars and spare tire, all the authentic details are here.

Part no.—B-153; price—\$20.



34

Tuff Stuff

OK, so—technically—it doesn't "bolt on," but it can be stuck on, and we figure that's close enough. This light, durable, adhesive, low-friction chassis protector from Litespeed protects your chassis from wear when it bottoms out, and because it smooths the airflow under your car, it reduces drag and increases stability and speed.

Part no.—0175; price—\$6.95/8x14-inch sheet.

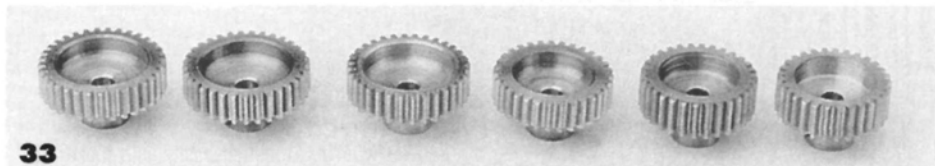


36

Schottky Diode

This Reedy Modifieds diode improves braking because it keeps the MOSFETs cooler; it increases the efficiency of today's high-frequency ESCs; and it improves the ESC's regeneration capacity. By reducing the chance that high-voltage spikes will reach your ESC, you'll reduce the wear and tear on it and thus reduce motor wear.

Part no.—745; price—\$5.25/pair.

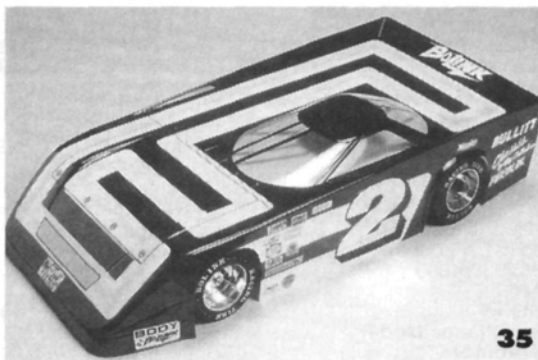


33

Titanium Gold Pinions

Robinson Racing makes some of the best pinions on the market—the Titanium Gold series. They're now lighter and coated with titanium nitride (a self-lubricating coating that reduces friction and wear). They're available in 48 pitch, 12- through 35-tooth sizes, and in 64-pitch, 16- through 47-tooth sizes.

Price—\$4.95 each.

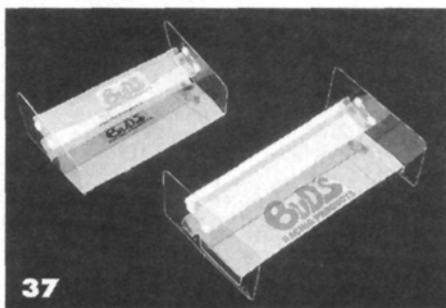


35

Hustler Wedge

Dirt track racers who want the edge they need to win should try this new Bolink body. It fits the Intimidator and ReFlex and most other dirt-oval chassis. Its front end has been flared and ribbed to increase strength and rigidity. The rear end has a built-in 1-inch air dam.

Part no.—BL-2304; price—\$18.95.



37

Bi-Level Wings

These are the wings of the '90s—strong, light and functional. Bud's Racing Products' Bi-Level Super wing will fit any 1/10-scale on- or off-road car. The Airflow Adjustable Bi-Level Wing is the fastest wing on speedways, roadcourses, and dirt tracks.

Part nos.—5237, 5238; prices—\$10.95, \$8.95.



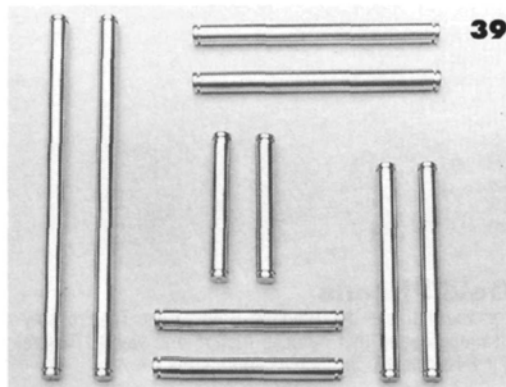
38

Three-Spoke Wheels

These OFNA wheels come in three colors: white, red and green. Made of nylon to fit many 1/8-scale off-road buggies, they're strong but light, and the white one can be dyed.

Part no.—FR-4B; price—\$13.95.

40 Bolt-Ons UNDER \$20

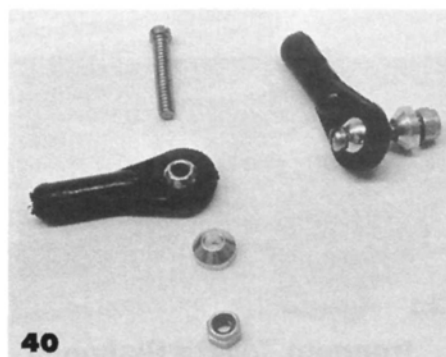


39

RC10 Team Titanium Hinge Pins

Put your car together easily with these precisely ground and polished titanium hinge pins from Lunsford Racing. They're also available for Losi and Traxxas cars. Metric titanium hinge pins are available for Schumacher and Kyosho R/C cars.

Part no.—H-500; price—\$20.



40

Swivel Ball Joints

Are you tired of your ball ends popping off? Here's your answer: these swivel ball joints from Motor Man *can't* come off. They come with aluminum cone washers, aluminum nuts and thread-locking compound.

Part no.—MMHEIM; price—\$4.95.

MANUFACTURERS INDEX

A&L Mfg.

P.O. Box 2115
Corona, CA 91718
(714) 735-5249

Associated Electrics

3585 Cadillac Ave.
Costa Mesa, CA 92626
(714) 850-9342

B&R Motorworks

28143 Shelter Cove Dr.
Saugus, CA 91350
(805) 296-0457

Bolink R/C Cars

420 Hosea Rd.
Lawrenceville, GA 30245
(404) 963-0252

Bud's Racing Products

1575 Lowell St.
Elyria, OH 44035
(216) 284-0270

Class Recreational Products

RD 1, Box 187A,
Cosby Manor Rd.
Utica, NY 13502
(315) 724-8052

Custom Works

3720 Easton Dr., #6
Bakersfield, CA 93309
(805) 323-0471

Dahm's Racing Bodies

P.O. Box 360
Cotati, CA 94931
(707) 792-1316

DuraTrax

Great Planes Model Distributors

P.O. Box 9021
Champaign, IL 61826-9021
(217) 398-3630

Dynamite

4105 Fieldstone
Champaign, IL 61821
(217) 355-9511

ESP Mfg.

20 Crystal Lake Plaza
Crystal Lake, IL 60014
(815) 455-5440

Flying Point

6N258 Acacia Ln.
Medinah, IL 60157
(708) 980-4863

Kyosho

Great Planes Model Distributors

P.O. Box 9021
Champaign, IL 61826-9021
(217) 398-3630

Holeshot Racing Products

P.O. Box 630
Canton, MA 02021
(508) 587-0663

HPI

22600-C Lambert St.,
Suite 904
El Toro, CA 92530
(714) 837-3250

Litespeed

P.O. Box 4765
Spokane, WA 99202
(509) 535-2717

Lunsford Racing

619 First Ave. E.
Albany, OR 97321
(503) 928-0587

Magic Motorsports

1901 E. Linden Ave., #8
Linden, NJ 07036
(908) 862-1705

McAllister Racing

1000 N. Humphreys St.,
Suite 204
Flagstaff, AZ 86001
(602) 556-0665

MP

746 E. Edna Pl.
Covina, CA 91723
(818) 339-9007

Motor Man

8950 Osage Ave.
Sacramento, CA 95828
(916) 381-7491

OFNA Racing Division

18 Technology, Suite 189
Irvine, CA 92718
(714) 753-6056

Paragon Racing Products

690 Industrial Circle
Shakopee, MN 55379
(612) 496-0091

Parma International

13927 Progress Pkwy.
North Royalton, OH 44133
(216) 237-8650

Point Blank

1901 E. Linden Ave., #8
Linden, NJ 07036
(908) 862-1705

Pro-Line

P.O. Box 456
Beaumont, CA 922230
(909) 849-9781

PSE

13927 Progress Pkwy.
North Royalton, OH 44133
(216) 237-8650

Racing Jack

7021 Veterans Ave.
Brooklyn, NY 11234
(718) 251-7660

R/C Performance Specialties

18312 Gifford St.
Fountain Valley, CA 92708
(714) 962-6928

Reedy Modifieds

3585 Cadillac Ave.
Costa Mesa, CA 92626
(714) 850-9342

Rex

7021 Veterans Ave.
Brooklyn, NY 11234
(718) 251-7660

Robinson Racing Products

4968 Meadowview Ln.
Mariposa, CA 95338
(209) 966-2465

RPM

14978 Sierra Bonita Ln.
Chino, CA 91710
(714) 393-0366

S&K Racing Products

215 South Market St.
Oskaloosa, IA 52577
(515) 673-6930

Team Losi

13848 Magnolia Ave.
Chino, CA 91710
(909) 465-9728

Tekin Electronics

940 Calle Negocio, Suite 140
San Clemente, CA 92673
(714) 498-9518

Thorp Mfg. Inc.

4054 E. Mission Blvd.
Pomona, CA 91766
(909) 622-6518

Traxxas Corp.

12150 Shiloh Rd., #120
Dallas, TX 75228
(214) 613-3300

TRC

2211 Charter St.
Albemarle, NC 28001
(704) 982-0507

Trinity Products Inc.

1901 E. Linden Ave., #8
Linden, NJ 07036
(908) 862-1705

**8-CYLINDER
OUTLAW**



Quarter-Scale Sprinter

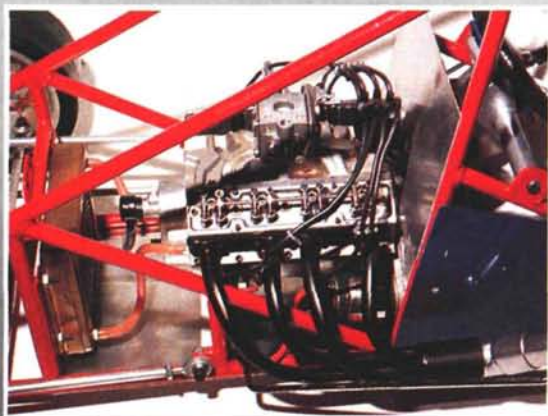
by
**FRANK
GUDAITIS**

THE 1/4-SCALE Sprinter is a replica of one of the most famous present-day sprint cars. The full-size Sprinter is driven by the legendary Steve Kinzer—winner of 12 out of 14 national World of Outlaws championships.

The car's tig-welded 4130 aircraft-grade chrome/moly steel-tube space-frame chassis is a product of the Wencar Company*. This company also makes axles, radius rods with spherical ball ends and hardened hex-steel torsion

bars. The working 4130 chassis is available from Wencar*. Oil-filled hydraulic shock absorbers, MacPherson-type coil-overs, tie rods and the tires and wheels are also readily available.

The most interesting thing about this car isn't obvious at first. Just like its full-size "big brothers," all the functional mechanical components are adjustable. This includes the torsion bars, the quick-change rear end, the radius rods, the spring tension on the oil-filled shock absorbers, the angle at which the top wing is positioned, the stagger of the tires, the spring tension on the centrifugal clutch and the disk brake. This vital feature allows the car to be set up according to the track's length and configuration.



The working V8 engine is from Conley Precision Engines, and it has water-cooling and a 540-size electric motor for a starter. This potent powerplant looks and sounds like a full-size engine.

This is largely the work of Wencar's Tom Wenzel. Tom's background includes building and racing several full-size midget race cars, so this 1/4-scale race car is set up to handle exactly like a full-size sprint car. This is a much admired feature that never fails to intrigue those who have actually driven the full-size cars in competition.

This model has a wheelbase of 22.5 inches, and it weighs 25 pounds. The scale tires have 6-inch-diameter rubber up front and 8x5-inch-wide tires in the rear. The aluminum wheels have quick-change hubs.

TINY POWERPLANT

The Conley V8 engine is presently the smallest working V8 in series production. It's a 4-stroke pushrod mill with an aluminum water-cooled block. Each of the eight cylinders has an .875-inch bore with a .625 stroke. The power output is 2.2hp and it can turn up to 10,000rpm!

Instead of spark plugs, glow plugs fire the combustion chambers. A built-in water pump circulates the cooling water through a scale radiator. Lubrication oil is mixed with the fuel, and this eliminates the need for an oil pump. The centrifugal clutch is mounted on ball bearings, and it's at the rear, in the bell housing. The intake manifold supports a

Walbro carburetor, and the fuel pump is cam-driven.

ASSORTED MECHANICS

The car has a molded-plastic tail section (also available from Wencar). The .030-inch-thick aluminum hood and side panels—as well as the top and front wing—were made by owner Al Novotnik, who also assembled and finished it. The top wing is held in place with Velcro® strips, so it can fly off easily in an accident.

A 4.8V battery supplies power to the on-board starter and to the control electronics. A 2-channel radio controls the steering and the throttle, which is coupled to the disk brake. Throttling down the engine also actuates the brake.

If you'd like to own a miniature race car, a number of small companies can help you achieve this goal. They supply most of the components that go into building a 1/4-scale car. The model shown on these pages was basically built from such parts.

**Here are the addresses of the manufacturers mentioned in this article:*
Wencar Company, 261 Broadway, Huntington Station, NY 11746.
Conley Precision Engines Inc., 825 Duane Ave., Glen Ellyn, IL 60137. ■



Legendary Outlaw Sprint Car driver Steve Kinzer at the wheel of the full-size car. Steve has won 12 out of the 14 World of Outlaws national championships.

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CALL TOLL FREE: 1-800-673-9563

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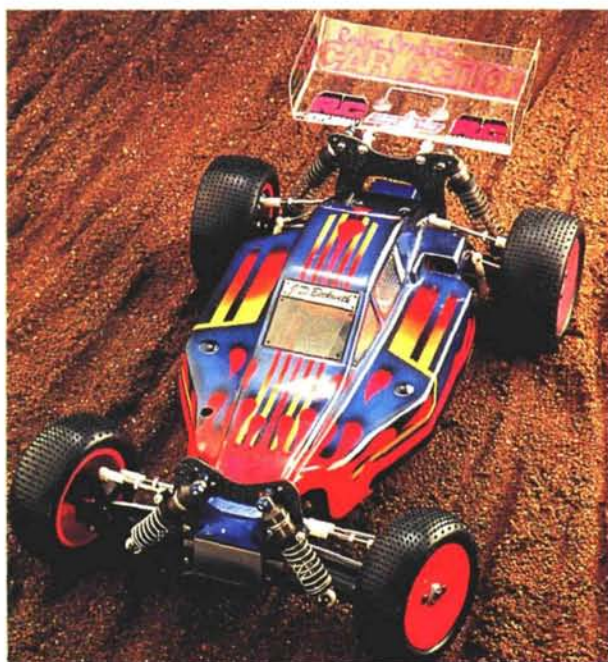
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ALL THE DIRT THAT'S FIT TO PRINT

RADIO CONTROL CAR ACTION

RACER NEWS

WORLD-CLASS RACING



The Duke Concept Now Offers Parts for Yokomo 4WD Cars



pieces and offer improved geometry. **Rear arms** (part no. DCOD105, \$35) are also offered. The arms are designed to extend the width of your Yokomo to maximum allowable limits. Additionally, a **Ball Bearing Steering kit** (part no. DCOD106, \$25 w/o bearings), also made of black Delrin and featuring titanium mounting posts, is available.

Finally, the Duke makes **Titanium Center Shafts** for the **Works '93** (part no. DCOT107) and the **YZ10** (part no. DCOT108) that will lighten and strengthen your car's drive train. The shafts are \$15 each.

For more info on these products (or any new items not listed here), contact **The Duke Concept**, 1570 Mallard Ln., Oakley, CA 94561; or call (510) 624-3134. Custom-machining is also available. Call for details.

Factory ace J.D. Beckwith's company—**The Duke Concept**—proudly announces the release of a new line of hop-up accessories for Yokomo 4WD cars.

For years, J.D. has been making custom parts for his own '92 ROAR National Champion Yokomo YZ-10/Works '93 racecar to improve handling and durability. Pressure from other Yokomo owners has finally convinced "the Duke" to mass-produce his creations and to make them available to everyone—not just factory drivers.

Duke Concepts offers a line of chassis components made of iridium-finish graphite, which has tiny metal flakes imbedded in its surface that produce a sheen when viewed in bright light. A chassis set (part no. DCOG100, \$100), which includes the chassis and the battery hold-down tray and posts, is a direct replacement for your Yoke's stock chassis. It's much stronger than stock, and it holds the batteries in the middle of the car for improved weight distribution. Other parts made of this material include a **Top Stiffener Plate** (part no. DCOG101, \$32) and front (part no. DCOG102, \$18) and rear (part no. DCOG103, \$18) shock towers.

Suspension components made of very rigid black Delrin are also available. **Front A-arms** (part no. DCOD104, \$25) replace the stock

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Pro-Line/Car Action Cactus Classic



ASSOCIATED'S NEWEST ROUND-POUNDER

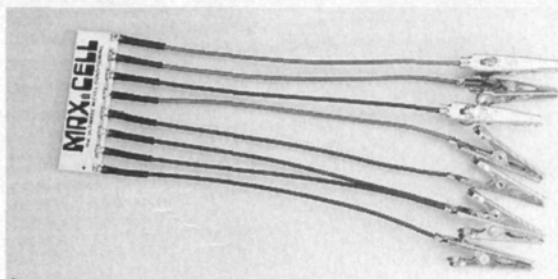
What do you do with a car that has won the ROAR On-Road Nationals **four years in a row**? You make it better, of course. Associated is proud to announce the release of its latest on-road car—the **RC10LS**. The all-new RC10LS features Associated's **Dynamic Strut** front suspension, which improves steering and handling. The Dynamic Strut front-end features adjustable camber, caster, toe-in and toe-out. Other new features include a **new and improved** shock with new Teflon assembly parts and Teflon shock pistons; and a new rear chassis brace that increases rigidity. For all of you out there who are worried about the original 10L—don't! It's still available. The 10LS retails for \$250, and it should already be on the tracks as you read this.

K/N Winter Point Series Winners

Karen and Nick Kahl's **K/N Speedway** in Stafford Springs, CT—one of the finest indoor banked carpet-oval tracks in the country and the site of the very first PROCAR Nationals—hosted a hotly contested **point series** this winter in which **Team Trinity** drivers **Todd Putnam** and **Shane Kocher** were victorious.

Putnam, the 1/10-scale series winner, drove an Evolution 10SS, while Kocher was triumphant in the 1/12-scale class. In addition, Kocher **broke the track record** (previously set by Chris Doseck) with **66 laps in 5:01**.

All cells are equal



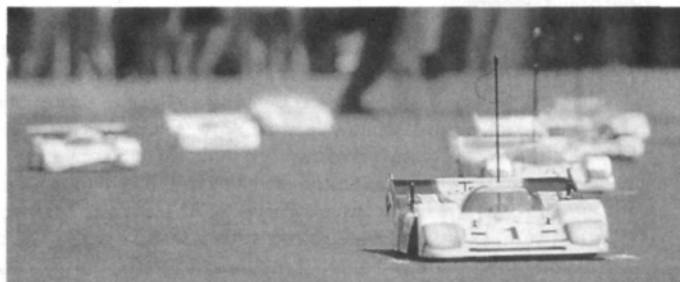
From Maximum Performance Products MC² (Max-Cell) comes the **Pack Manager** cell equalizer. Easy to use, the Manager clips to **each cell** in your battery pack to ensure that they all **discharge equally**—without cell reversal—to **maintain the match** of your expensive battery pack.

Here's how to use the Pack Manager: when you've finished your race, attach the Manager to **each cell** (in series), but first be sure that no cells have **voltage readings** higher than **1V to 1.5V** (use light bulbs to bring the pack down to the proper voltage level if necessary). Leave the Manager connected until the cells' voltage is down to **approximately 0.1V**. Your pack will now be **equalized** and ready to be **recharged**. It's that simple, and your cells will thank you.

Baker Wins Futaba Grand Prix

The crème de la crème of on-road racers converged on the **Racer's Haven** track on the weekend of **May 22 and 23** to do battle in the 11th annual **Futaba Grand Prix**.

When the A-Main was over, **Barry Baker** took the checkered flag, and off-road guru **Brent Wallace** finished second. Following Wallace was Team Novak's own **Tyree Phillips**. All three drivers finished ahead of **Top Qualifier Kevin Jelich**.





PROCAR UPDATE

The PROCAR World Series of Racing is racing across America. In its first 30 days, nearly 500 drivers have participated in the series. Because drivers can purchase and receive all their membership materials at the track, more racers sign on all the time. With PROCAR's unique point series, it's never too late to get involved.

The action has been hot and heavy at K/N Speedway in Connecticut. Nick and Karen Kahl have been strong supporters of the PROCAR series right from the start. Their promotional efforts are really paying off: they've signed up more than 80 PROCAR drivers at their track.

Paul Covington's PC Hobbies/King Superspeedway in North Carolina is also reporting record turnouts for the PROCAR qualifiers, with drivers coming from as far away as New York to race on "The King." Paul says that the PROCAR racing has been fantastic.

With the Northern Nationals held in June at K/N, and the Mid America Nationals at Larry Annis' Mattoon, IL, Ameri-Trac, qualifying action is really heating up. If those two events weren't in your part of the country, we'll see you down at Lake Whippoorwill Speedway in Florida over the Labor Day weekend. The Southern Nationals should be a real treat. This track is legendary, and so is Bob Hosch. Of course, after "the Whipp," we're all going to Disney World!

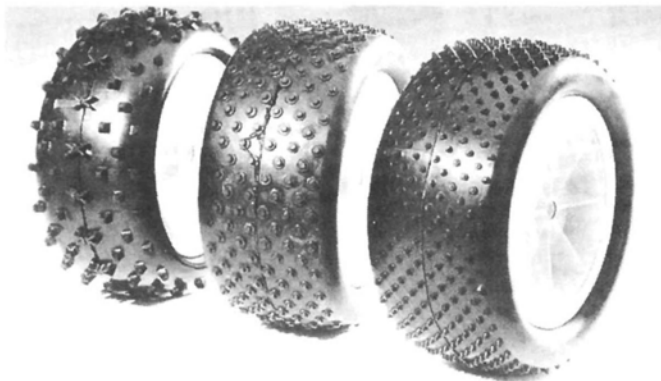


One of the hot topics in the Sportsman Challenge series has been the PROCAR '93 stock motor. The motor is receiving rave reviews from track owners and racers. Paul Covington of PC Hobbies/King Superspeedway

HOT STOCK

tells us, "The motor is producing the best stock-class racing ever seen at the King." Racers love the extra performance they get from the 21-turn, 12-degree motor. This motor runs fast and lasts. Many tracks are beginning to use the PROCAR '93 motor for all their stock-class racing. The motor is available from CAM, Trinity, DuraTrax and Point Blank.

Losi Goes Gooney



Hey, boys and girls...it looks as if Team Losi has an all-new tire compound headed your way! We got the scoop straight from Jack Johnson that Losi will produce a new, softer, higher-traction tire compound. When Jack was racing his 1/8-scale gas buggy in Europe, he noticed that a few of the European drivers were racing successfully with sets of tires that had tread designs that "really shouldn't have worked well." After thorough testing, Team Losi found that

these tires worked because they were using an all-new, soft compound. So the Losi guys began to test tire characteristics, such as stretching, rebound, softness and wear properties, in search of the ultimate soft-compound tire. They've been playing with different versions of the tire for six months, and they will be releasing only certain tire designs (slippery-surface-condition treads) in this compound for their 2.2-inch, 22 Caliber wheels.

Bulletin

In an effort to expand PROCAR racing in the West, PROCAR has

scheduled the Western States Championships. The race will be hosted by AMS Raceway in Reno, NV, on the weekend of

September 12. Drivers who have participated in at least two PROCAR qualifying races will be qualified for this event. It will be used as

a World Championship qualifier for Sportsman Challenge and Formula America drivers. No cash prizes will be awarded.

R A C E R



N E W S

SPEED SHOP

INSIDE LINE Front Bumper Shear Bolts

The Inside Line front-bumper shear bolts were designed to prevent your car's front-bumper mounting screws from being pulled through your chassis in a front-end collision, thereby ruining your otherwise perfect chassis. The head of each $\frac{8}{32}$ aluminum shear bolt will snap off before it damages the chassis, but, in most cases, it will still allow you to finish the race. The bolts come in packages of six.

Part no.—2504; **price**—\$5.90.

The Inside Line, 12859 Rt. 108, Highland, MD 20777; (301) 854-2701.



TRINITY PROCAR Stock Class Spec

PROCAR uses its own spec-class stock motor, and it's the only motor allowed in PROCAR events. These 21-turn, 21-AWG motors can be bought only through hobby shops. With 12 degrees of timing and a locked commutator, they're very fast, especially on oval tracks.

Part no.—2121; **price**—\$25.

Trinity Products Inc., 1901 E. Linden Ave., #8, Linden, NJ 07036; (908) 862-1705.

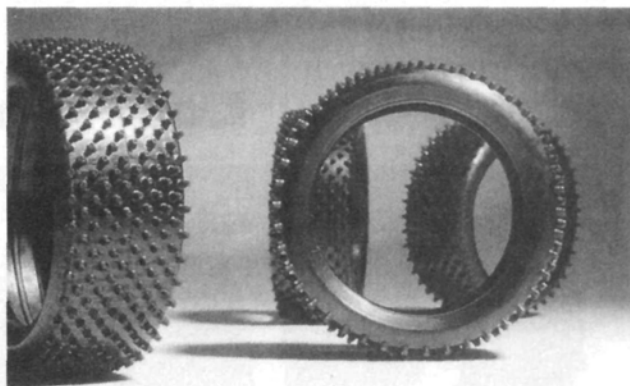


PRO-LINE $\frac{1}{8}$ -Scale Tire

These new $\frac{1}{8}$ -scale tires were developed specifically for off-road racing. Two top drivers used them with Pro-Line's Original XT Compound in the A-Main at the 1992 Gas Off-Road World Challenge. Made of an advanced, light rubber blend, they have sharp spikes in a diamond pattern. Use them on the Kyosho, the Pirate and the Mugen's narrow $\frac{1}{8}$ -scale wheels.

Part no.—9010; **price**—\$19.95.

Pro-Line USA, P.O. Box 456, Beaumont, CA 92223; (714) 849-9781.

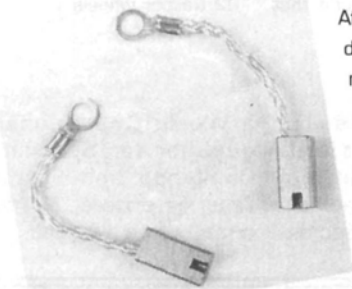


CLASS RECREATIONAL PRODUCTS Silver Streak Brushes

After months of testing and sampling silver brushes, Team Class has released the first silver brush that doesn't require a comm truer. These brushes are easy on the commutator and provide plenty of gear-ripping power. They work well in 24-degree motors and in hot modifieds. The Silver Streak venturi brush features the Team Class venturi cooling system that supplies your motor with cool air.

Part nos.—7003 (venturi brush), 7013 (full brush), 7023 (half-high cut brush), 8003 (venturi brush with eyelets), 8013 (full brush with eyelets), 8023 (half-high cut brush with eyelets); **prices**—\$4.75, \$3.50, \$4.25, \$5.24, \$3.99, \$4.74.

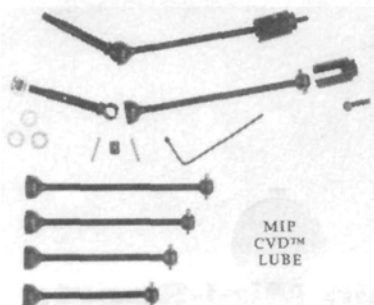
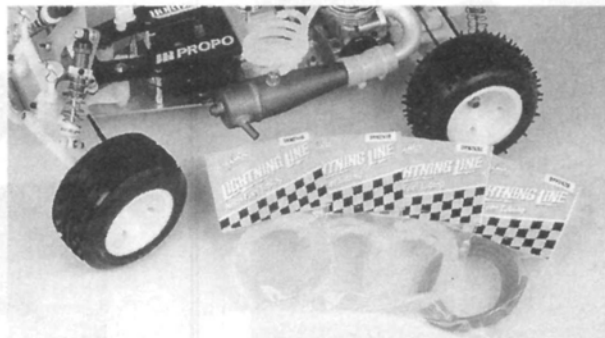
Class Recreational Products, RD 1, Box 187A, Utica, NY 13502; (315) 724-8052.



DYNAMITE Lightning Line

Dynamite's new Lightning Line neon fuel tubing is just what you need to add pizzazz and give your R/C model a professional look. It's as functional as it is impressive. Made of durable, flexible silicone tubing, it can be tightly coiled without kinking and won't become deformed when it's exposed to heat. It's available in a convenient 2-foot length, so you can use one package for several models. Lightning Line also fits all standard pressure taps and fuel-nipple fittings. It comes in neon green, neon pink, neon yellow and neon red.

Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.



MIP CVDs for Losi Cars and Trucks

MIP Constant Velocity Drives (CVD) for Losi cars and trucks will be ready for summer racing. These module drives can be rebuilt, and they have one-third the measurable output interruptions of common universals and near-zero backlash. Now *these* are universals that make sense. They last up to six times longer than standard universals or dogbones. They're sold in pairs, and replacement parts are available separately.

Part nos.—CVD-LB (standard tranny with H-arms), CVD-LT (standard tranny with LX-T arms), CVD-XXB (XX tranny with H-arms and MIP Pro Box), CVD-XXT (XX tranny with LX-T arms and MIP Pro Box); **prices**—\$39.50; \$44.50; \$29.50; \$34.50.

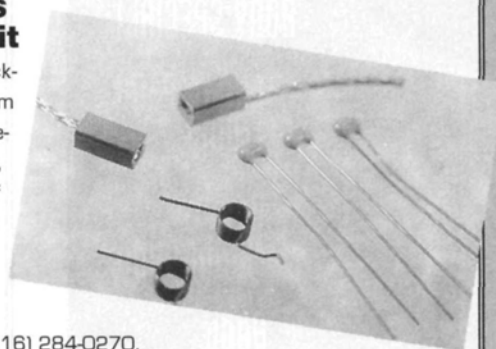
MIP, 746 E. Edna Pl., Covina, CA 91723; (818) 339-9007.

BUD'S RACING PRODUCTS Stock Motor Power Kit

This kit was designed for the stock-motor racer who wants the most from his motors. It comes with Bud's race-proven hollow HPS motor brushes, motor capacitors and a variety of springs. A helpful instruction sheet makes it easy to tune up the power.

Part no.—7105; **price**—\$7.95.

Bud's Racing Products, 1575 Lowell St., Dept. RCCA, Elyria, OH 44035; (216) 284-0270.



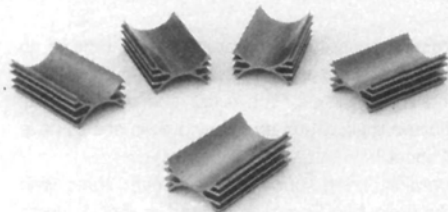
K&S ENGINEERING Soldering Guns

K&S now offers three new, improved versions of its soldering guns and irons. The 100W gun instantly provides up to 600 degrees of heat, and it comes with two tips. The 30W and 60W irons are balanced for easier handling. Each comes with a holder.

Part nos.—300 (30W), 910

(60W), 1210 (100W); **prices**—\$6.95, \$7.95, \$15.95.

K&S Engineering, 6917 West 59th St., Chicago, IL 60638; (312) 586-8503.



ASTRO-RACE Bat-Sink

The Bat-Sink heat sink for battery packs really pulls the heat out of the cells and helps prevent heat damage. It also offers many other advantages: it lets you charge cells at a higher rate without heat damage; it allows for over-gearing; it facilitates pack assembly; and it prolongs battery life. The reusable, light aluminum-alloy heat sinks are available for stick packs or side-by-side packs.

Price—\$12.50

Astro-Race Products, 2724 W. Palm Ln., Phoenix, AZ 85009; (602) 272-9246.

Descriptions of the products shown on these pages were derived from press releases supplied by manufacturers and/or their advertising agencies. The information given is neither an endorsement of the product by *Radio Control Car Action*, nor a guarantee of performance or safety. If you write to the manufacturer about any product described here, be sure to say that you read about it in *Radio Control Car Action*.

Hyosho

Gas Challenge

FEATURES

BODY SPECIAL!

- ▶ Cheap Paint Tricks
- ▶ How to Mount Bodies
- ▶ Body buyers' guide

Home-Built Video Truck

Airtronics Caliber User's Guide

TRACK REPORTS

Trinity EV10ss

Schumacher 2000

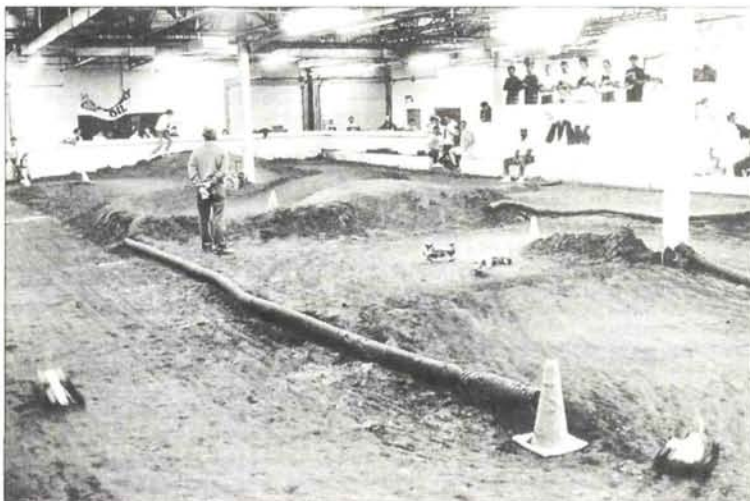
Mugen Toyota Stadium Truck

R A C E R



N E W S

HOT TRACKS



Rocky Mountain Mini-Sports DENVER, COLORADO

WHAT ELSE IS there to do in Colorado besides skiing? R/C racing, of course! Wanna match skills with some of the best off-roaders around? Do you want to have fun? Then head for Rocky Mountain Mini-Sports so you can say that you did it in the dirt the "mile-high way!" On any Wednesday or Saturday evening, in various series and championship races, you'll find the area's top guns duking it out.

Rocky Mountain Mini-Sports owner John Weins is constantly looking for ways to bring fresh talent into off-road racing, and he encourages the better drivers to spend time helping beginners. Racer input on track layouts is always welcome; the challenging configurations include moguls, tabletops, triple/quad jumps, banked turns and elevation changes that test your abilities to the max! The 96x46-foot indoor course is changed bimonthly and runs the gamut from tight and twisty to long and fast.

Ample pit space with tables and electricity can accommodate 100 competitors. And a huge drivers' stand offers an excellent overview of the course. R/Cers who have multiple vehicles (and lotsa equipment!) and don't want to carry their goods to and from the track can rent a separate room with counters and locking cabinets. The newest AMB lap-counting system has been hooked up to a computer to keep lap/time controversies to a minimum and to provide complete printouts of race results. Tiered seating is provided for spectators, and game and vending machines satisfy everyone during intermissions.

The front of the complex contains a well-stocked hobby shop that specializes in all aspects of R/C: off-road trucks and buggies, boats, helicopters and airplanes. A complete selection of parts, performance accessories, motors, engines, batteries, chargers and radios are all offered at competitive prices. The friendly, knowledgeable staff will make sure that you get the right stuff!

The monthly racing schedules give oval racers, pullers and monster-truckers time to do their thing, and plans are underway to give nitro fans an opportunity to tear up some turf. Rocky Mountain Mini-Sports is also considering seminars, "fun runs" and other similar activities to offer everyone the chance to improve their set-up and driving skills and to have a good time. Isn't that what this hobby is all about?

Next time you head for the Rocky Mountains, bring your R/C equipment along with your skis, and stop by for a visit! Rocky Mountain Mini-Sports is located at 6401 North Broadway, Unit G, Denver, CO 80221; (303) 426-0110. Business hours are Monday through Friday, 10 a.m. to 9 p.m.; Saturday, 10 a.m. to midnight; and Sunday, noon to 5 p.m. See ya real soon!



Off-Road

P R E

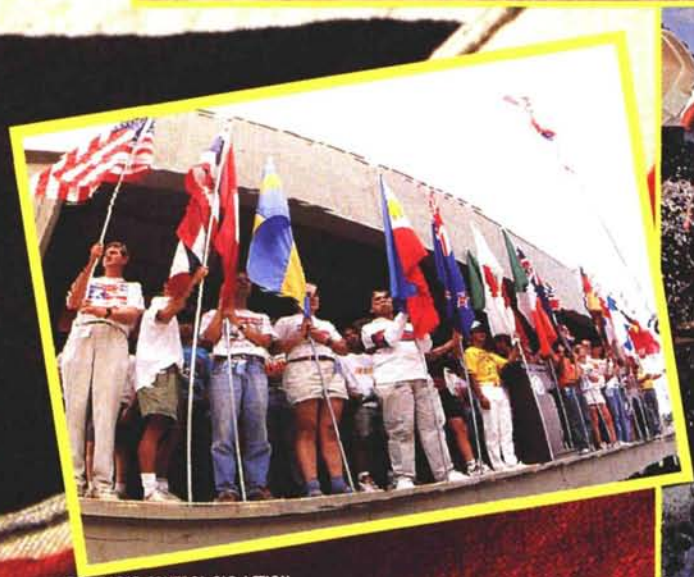
BATTLE



by GEORGE GONZALEZ

THE BIGGEST event in 1/10-scale off-road racing is just around the corner. The IFMAR (International Federation of Model Auto Racing) World Championships, sponsored by Associated Electrics and Parma/PSE, will draw 150 of the top transmitter jockeys from all over the globe to Basildon, England, from July 28 to August 8. Every factory team will be represented at the Worlds, and each will be vying for the prestigious title of World Champion.

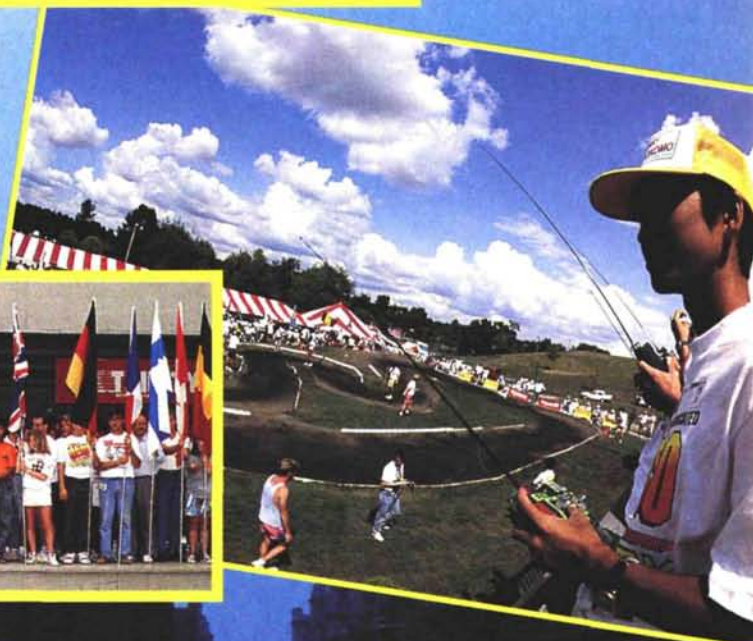
Competing drivers had to qualify for this race—no race-entry forms here! To compete in the Worlds, drivers had to be invited by one of the three divisions of IFMAR: ROAR (Radio Operated Auto Racing), EFRA (European Federation of Radio-Operated Modelautomobiles), and FEMCA (Far Eastern Model Car Association). Only the best drivers in the world will compete—a guarantee that the action at the upcoming Worlds is going to be scorching hot.



d Worlds

V I E W

F BRITAIN



A CHANGE OF SCENERY

Teams from Associated, Losi, Traxxas, Yokomo, Schumacher, Kyosho and Tamiya (to name just a few) will be packing their bags and heading to Basildon, which is about 25 miles from London. With six rounds of qualifying heats and three mains in each category, there will be little time for sightseeing. The most racers will see is the view from the airport to the hotel and back!



THE TRACK

The hard clay track for this year's Worlds has a newly approved IFMAR layout. This brand-new track will be very tough, and the "tire wars" issue will surely be on every racer's mind. Rumor has it that Team Associated has booked an extra hotel room to warehouse more than 12,000 sets of

PHOTOS BY GEORGE GONZALEZ

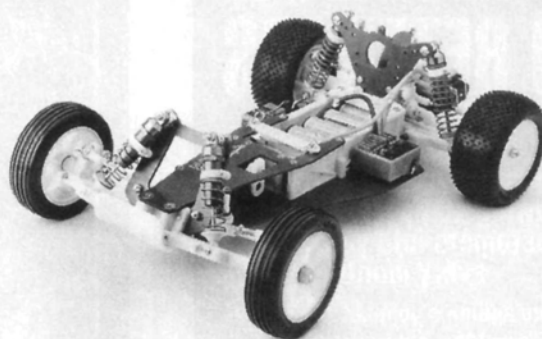


RICK VEHLow TEAM TRAXXAS

Rick has been preparing for the upcoming Worlds by competing regularly in the racing circuit. He says that the Worlds is just another race and that he will be ready when he gets there. (No doubt, Rick is a confident contender.) According to Rick, the drivers on his team to look out for are John Walters, Chris White and James Ward; any one of them is capable of pulling it off.

The Team Traxxas drivers will be driving the new TRX-3 car, which has a shorter wheelbase, a double-decker fiberglass chassis; new shock towers; new A-arms, A-arm mounts and steering blocks; new, stiffer axle carriers; a new, ball-bearing steering system with improved geometry and new, shorter front shocks.

The team to watch at the upcoming Worlds just might be Traxxas and, besides, the folks at Traxxas would like to shed the status of underdog once and for all.

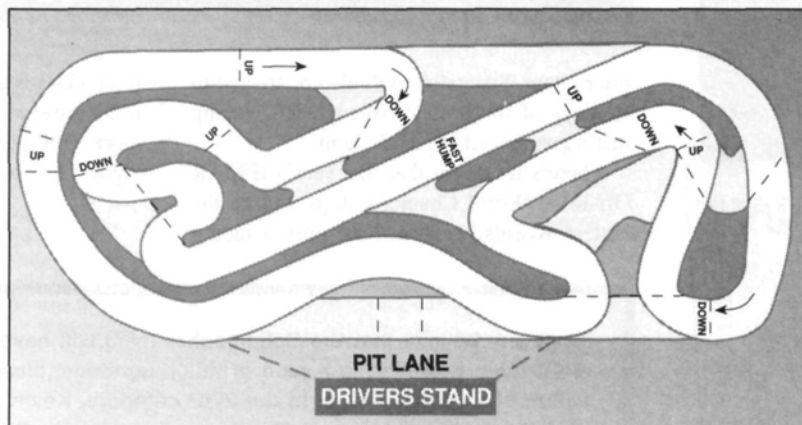


Traxxas will be headed to England with their long-awaited TRX-3 2WD. The car has a short-wheelbase, double-decker fiberglass chassis, which is extremely rigid.

tires for use by its drivers. Many tire manufacturers will bring every kind of tire compound and tread pattern imaginable. This is a major concern. There's no doubt that many of the tires that will be used at this year's Worlds won't be available to all of the racers, and some believe that this isn't fair. There is also the issue of special batteries and motors that are only available to a select few. Where do we draw the line?

A warm-up race is scheduled to give racers a chance to try out the new track and test different setups. According to IFMAR rules, however, 60 percent of the track layout must be different

1993 IFMAR 1/10TH OFF-ROAD WORLD CHAMPIONSHIPS T.E.M.A.C. PROVISIONAL RACE CIRCUIT



IFMAR-style—i.e., the drivers will be randomly placed in qualifying heats, and each driver will receive a starting signal at 1-second intervals. This method ensures that the racers will race the clock, not each other. A triple A-Main format will be used in both the 2WD and 4WD classes. According to the IFMAR rules, the drivers' best two finishes in the mains will be combined to determine their final race time. To ensure accuracy, an AMB, 10-car, automatic

lap-counting system will be used.

All drivers will pit together under one large tent; this will allow them to snoop around a little (in a very professional manner, of course). Another tent will be set up so that manufacturers can display their latest products. Spectators can mingle with the pros in the pits and check out the manufac-

from that used at the warm-up race. This ensures that no driver will enjoy the "home track" advantage. Drivers will have to modify their driving techniques and their cars' setup for the new track layout.

WHAT TO EXPECT

The six rounds of qualifying will be done



Can Losi's Jack Johnson become the next "king" of off-road?

JACK JOHNSON TEAM LOSI

Although Team Losi has not won an IFMAR Worlds since 1985 when Gil Losi, Jr. drove a 4WD Yokomo, Jack Johnson has been working hard to ensure that they take home the title this year. Team Losi has many good drivers, but the ones who are going to make some waves are Jon Anderson, Jay Halsey and, of course, Jack Johnson.

Team Losi drivers will be racing Double-X cars, which have been redesigned from the ground up. Look for details about the new Double-X car in the 1993 edition of *Radio Control Racer*. Team drivers will be using new, softer tires that are designed for the new IFMAR track.

Team Losi has been preparing for this event for two years, and they're definitely going to be a major player at this year's Worlds.

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OFF-ROAD WORLDS PREVIEW



Defending 4WD champion Cliff Lett counts teammates Brian Kinwald, Mark Pavidis, Craig Drescher and Masami Hirotsuka as the ones to beat this time around.

CLIFF LETT TEAM ASSOCIATED

Cliff admits that because of other commitments, he has not had the time to practice for the upcoming Worlds. He also stated that if he had to put money on the race, he wouldn't bet on himself. No doubt, Cliff will go all out come race day, and that's enough to make him a threat anywhere. Team Associated will have more than 20 drivers competing at the Worlds. Cliff says the drivers on his team to watch are Brian Kinwald, Mark Pavidis and Craig Drescher. These guys are definitely going to catch some air. Cliff thinks that defending his 4WD World Champ title against Team Yokomo's Masami Hirotsuka is going to be tough. Kevin Moore from Team Schumacher is also a top contender for the title.

The team drivers for Associated will be using standard-issue Team Cars. Sorry guys, no mysterious Stealth Cars here!

turers' tent. Spectators will also be treated to 12 days of the hottest off-road R/C racing that's guaranteed to please them.

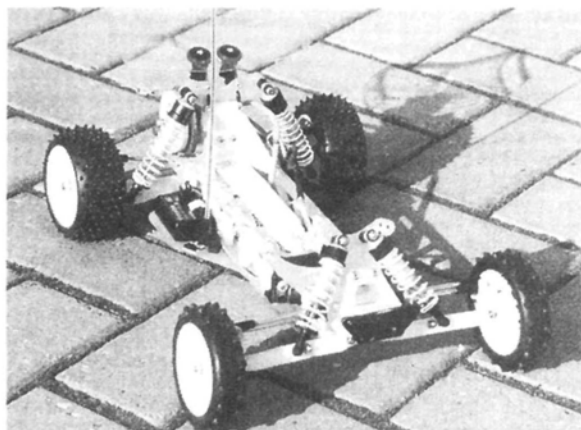
There's no doubt that this year's IFMAR Off-Road World Championships will be the hottest Worlds ever—at least until a racing

truck class is added to the agenda. One thing is for sure: all the top drivers will be giving more 100-percent effort to bring home the highest R/C honor—"the best in the world."

Many believe that the Schumacher team will have the home-court advantage; however, in a race of this magnitude, close proximity to the track will not be an advantage. In the 2WD category, Kevin Moore, William Mitchum and Jürgen Lautenbach are the drivers to watch. In 4WD, Jay Halsey and Brent Wallace are sure to be the center of attention. Warren Clapp indicated that they have a good chance of winning in 2WD and of taking the 4WD category.

The Schumacher factory team drivers will be using the new Cougar 2000 in 2WD. This car has a new double-decker chassis, new suspension components and geometry and a state-of-the-art tranny that's equipped with a very effective slipper clutch and a new, super-smooth ball diff. In 4WD, factory drivers will be using very potent BossCats that might surprise the competition with some new upgrades as well.

WARREN CLAPP SCHUMACHER INC.



Schumacher will be on their home turf racing production units of the Cougar 2000. Seen here is an early prototype of the car. A double-decker fiberglass chassis and an all-new ball diff are two hot, new features from Schumacher.

NITRO NEWS

TOUGH BRAKES

by JEFF BRONSTEIN

MANY TOPICS IN "Nitro News"—suspension tips, engine-performance advice, or any of the almost infinite number of set-up tricks—deal with improving your racecar's speed. Speed, however, is only half of the racing

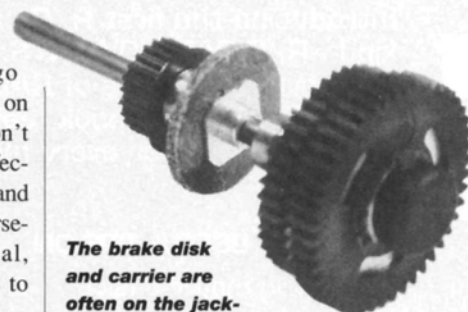
open, you then brake hard and go inside. When the top-dog racers are on the track, most casual observers don't notice their ability to use brakes effectively. Active braking is a true skill, and it's a lethal weapon in the racer's arsenal. Timing and setup are crucial, and they can take years of practice to master.

SLIPPED DISK

Although there are different types of brake, the mechanism used most often on racecars is the disk brake. This simple design is efficient and effective. Unlike the disk systems used on full-size cars, which are at the wheel, scale disks are on the jackshaft, or, in some cases, on the differential. The disks are clasped between pads by a rotating cam that's actuated by the throttle servo. On-road racers and 1/10-scale off-road trucks brake only through the rear wheels; the 1/8-scale off-road buggies use brakes on all four wheels.

Competitive racecars use either a fiber or fiberglass brake disk with metal pads, or a metal brake disk with Teflon-type pads. Both setups work very well, but each has special advantages.

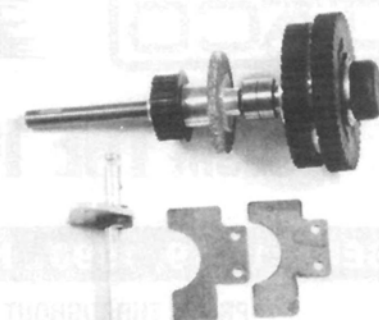
- **Fiber brake disks** are very strong, but their action can become inconsistent if they aren't maintained properly. The fiber can become glazed, and you'll have to scrape them to keep them clean. In rare cases, a disk will seize or catch on the brake pads, and this will cause it to disintegrate. Serpent has used fiber disk brakes on its 1/8-scale cars and on the new, 1/10-scale Impact with much success—mostly owing to high-quality material.



The brake disk and carrier are often on the jackshaft or the differential. On the Serpent Impact, a single fiber disk on the two-speed jackshaft is an ample brake.

Dual front and rear adjustable-bias fiber disks work exceptionally well on the Kyosho Inferno line.

- **Metal brake disks** are somewhat less brawny, but they're exceptionally smooth and predictable. Multiple disks can help boost braking power, but the

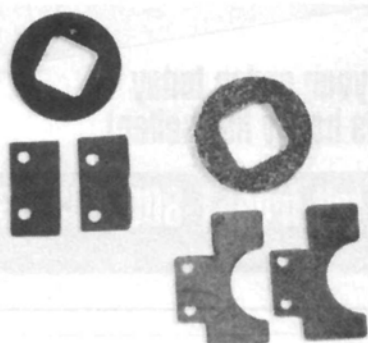


The brake disk (above) on the 2-speed jackshaft is clasped by two metal pads. The brake cam (lower left) is actuated by the throttle servo.

Teflon- or metal-impregnated pads wear quickly under hard use, causing "brake fade." BMT's Blitz metal disks are very consistent, though you should keep a stock of brake pads. Some cars can use either metal or fiber disks, and it's wise to try both before you decide which is best.

Whether you use metal or fiber disks, maximizing brake performance is the main goal. The greatest amount of braking force occurs just before the tires lose traction. Locking the brakes

(Continued on page 84)



The two most common types of disk brake are a metal disk with Teflon pads (left), or a fiber or fiberglass brake disk with metal pads (right). Both are simple and effective, but each has distinct advantages.

equation. This month's column "breaks" with tradition and focuses on slowing down—not in the sense of moving slowly, but going from fast to slow—quickly! Many racers make the mistake of concentrating on speed to the exclusion of everything else. Top speed is important, but very often, the fastest cars on the back straight don't win the race. Tough breaks, you say? Not! In fact, wimpy brakes can keep many racers out of victory lane.

Too much speed can be a dangerous thing for some racers. A classic racing strategy is to pressure your opponent hard on the straights, hoping to cause him or her to overshoot a corner. When the door is



The entire brake assembly—in this case, a 2WD brake from JR Racing—consists of the brake disk, the pads, the carrier and the actuating cam. To slow the car, the cam grips the pads and disk, just as a full-scale caliper would.



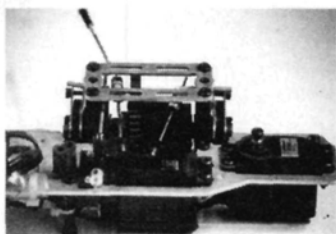
This 2WD brake uses a single metal disk and metal-impregnated pads. This 4WD chassis incorporates the brake on its mid-shaft, where it's easily accessible from the side of the car.

up completely will cause an uncontrolled skid. If the brakes cause the car to lose traction, it will either spin suddenly or slide past the corner. At full brake, the car should never skid or lose traction. Set the brakes properly to ensure that they don't lock and that they're always usable. First, the brake linkage must be arranged correctly (see "Nitro News—Missing Link," *Car Action* 12/92). It might take a while to seat new brake pads and disks properly.

"DRAG" BRAKING

You can modify brake pressure at the transmitter with the throttle trim and the endpoint adjustment. The throttle trim on some radios also moves the servo endpoint. Check your radio's features to be sure.

Most racers prefer that a small amount of brake be applied immediately when the throttle returns to neutral. This is called passive, or "drag" brake. Drag brake also helps to transfer weight to the forward tires before a turn. Drag brake, however, should not be used as a substitute for active braking. To work most effectively, brakes must be metered with the same finesse as the throttle. If you use the drag brake as a crutch, you'll eventually find yourself timing the braking points poorly. Brake differently for every corner: tight corners more aggressively and sweeping corners with only a light touch.

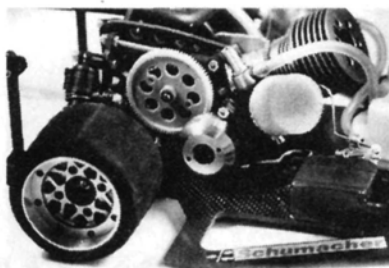


A single servo actuates the front and rear brakes and the throttle. The brake disks are on either side of the center diff carriers. Stopping an 8-pound buggy takes some seriously tough brakes.

A LITTLE IS ENOUGH

When you adjust the full-brake action, the throttle servo should rotate only minimally from the neutral setting to full brake. If you use drag brake, it takes only a slight movement to reach the maximum braking point. Testing should be done on the track. I like to do a final check during the warm-up, but get the adjustment close before it's time to race.

Observe the adjustment by applying full brake from several different speeds. If the car skids or the tires lock, dial the endpoint pot down slightly to reduce brake. Continue until the full-brake position on the throttle control maximizes the braking force.

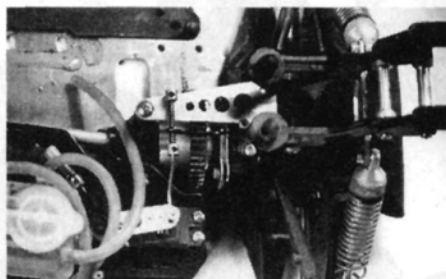


The Schumacher Nitro series use a brake shoe that engages the outside of the flywheel assembly. The design is different, but the braking principle is the same: to get maximum braking to the pavement or dirt.

Using 4W brake is slightly more tricky, but the same set-up principles apply. Front brakes are more effective, because the weight of the car shifts forward where it can help to stop the car. Kits that include a front/rear brake bias can be adjusted so that the front tires use this extra weight. In this case, it's particularly important that the front wheels don't lock, or all steering will be lost.

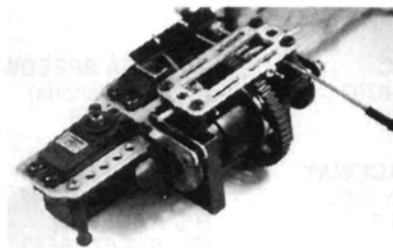
THE BRAKE-DOWN

Keep fuel and oil away from the brakes whenever possible. A sloppy pit stop could cause your car to lose braking while the fuel on the brake disk dries. If



The Mugen SS Toyota truck's large fiberglass disk (just behind the center diff) provides excellent braking power. A single disk in the center provides equal braking for the front and rear tires.

the brakes grab, try using a softer spring as a buffer between the linkage and the brake arm, then increase or decrease servo travel as needed. This will allow more control and greater consistency. Don't use fuel tubing as a buffer; it allows very little room for



The Kyosho Inferno has separate front and rear adjustable brakes that are mounted on either side of the center diff. Bias can be set to favor the front tires, where it's most effective. The standard disks are good, but the optional fiber replacements are unbeatable.

error. If you don't have enough brakes, try a spring-loaded clutch; they tend to disengage from the transmission more quickly. Also, the brake lever on the linkage should always be as long as possible to reduce the strain on the servo and yield the most control.

Tough brakes, and knowing how to use them, can expand your potential for passing on any track. Passing in tight corners and sweeping turns is always less risky than passing on the back straight. Brakes also make a big difference to driving style. Aggressive drivers use a considerable amount of energy accelerating toward each corner and braking very hard, but a smoother course around the track will save brakes and tires in a long race. Unlike electric racers, who have only four minutes to do all they can, gas racers must consider the scope of the longer main events. It's a sure bet that "tough brakes" got a lot of racers into the winners' circle. ■

TRAXXAS LS-II

(Continued from page 48)

EXCELLENT BLUEPRINTS

The LS-II's excellent instruction booklet is comprehensive and easy to follow. Experts and beginners will appreciate the quality of the photographs, the exploded-view diagrams, and the detailed text. The parts come in bags that are numbered to coincide with each step, and there's a full-size hardware chart on each page for easy parts identification. The booklet also includes a detailed tuning guide and a very helpful section on improving your driving skills.

You don't need special tools to assemble the LS-II; in fact, several tools are included in the kit, as are an ample supply of diff and thrust-bearing grease and 30W shock oil. The kit's molded parts fit together very well, and they're molded to tight tolerances. To ensure smooth operation, I lubed all the suspension joints and bearings.

ROCKIN' ELECTRONICS

To control the LS-II, I called my trusty Airtronics* XL-2P radio and receiver into action. For precise steering, I installed an Airtronics 94152 servo with the supplied servo mounts, and, for power management, I used a Tekin* 410K digital, high-frequency ESC, which I mounted on the shock tower with servo tape. The ponies for my LS-II are

supplied by a Point Blank* matched, 7-cell, Sanyo 1700 SCRC battery pack, and a Point Blank 11-turn, triple-wind, modified motor. After some testing with the LS-II's super-low gear reduction, I found that the 84-tooth spur gear with an 18-tooth pinion gear was the right combination for this setup.

I also installed a Litespeed* LiteSink to keep things cool. When you run a modified motor, using a heat sink can reduce motor temperature by as much as 30 percent; this will increase the motor's performance and yield longer run times. This unit works wonders; you should check it out!

TRACK TIME

I packed up all my gear and headed out to the *Radio Control Car Action* West Coast Testing Facility in Canyon Country, CA. This track is a scale version of a Mickey Thompson track, and it's absolutely brutal. (Sorry, folks, it's off limits to the general public!) It has every kind of obstacle imaginable, and it was the perfect place to torture my brand-new LS-II. My friend and fellow *Car Action* contributor Wally Cahill was ready with camera in hand, so we got the color action shots out of the way as well (talk about killing two birds with one stone). When the photo session was out of the way, it was time for some serious fun.

The LS-II flew into the high-speed

sweeper with a rooster-tail following three feet behind. Out of the sweeper and directly into a 45-degree right turn, the LS-II went into an awesome power slide with its nose pointing straight out of the turn. It went straight into the double jumps and cleared the second jump by about four feet. Next came a wide, 180-degree turn that posed no threat to the truck's excellent suspension; and then came a right-hand hairpin turn and the dreaded five-jump rhythm section. I came into the hairpin turn fast and furious, and the LS-II again went into a very impressive power slide with its nose pointing in the correct direction.

The five sequential jumps are impossible to clear with dignity and grace, but the Traxxas managed to go through in style. Next came another wide, 180-degree turn, a short straightaway, and then the hair-raising tabletop/tub jump, which is actually an overturned bathtub covered with dirt. I wanted to see what this truck was made of, so I hit the gas coming out of the 180-degree turn and piled into the tub jump at full speed. The LS-II went airborne: I've never seen so much altitude in my 10 years of R/C racing! I tapped the brakes while the truck was in the air, and it landed perfectly on all four tires. I measured the distance from the jump to the landing point; it was more than 15

(Continued on page 126)

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SCHEDULE: Friday—practice; Saturday—two qualifying rounds; Sunday—one qualifying round & Mains.

ENTRY FEE: \$35 for the first entry and \$25 for each additional entry. Limited to three entries per driver.

RULES: ROAR rules apply.

TROPHIES: Presentation on Sunday after the Mains.

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THE SEVENTH ANNUAL Cactus Classic, sponsored by Pro-Line and R/C Car Action, saw action from the big guys: Team Losi, Traxxas, Schumacher, Associated, Kyosho and Tomy had factory rides entered in the competition. Motor power was also in place, with Trinity, Reedy, Losi, Peak Performance and others putting out their best. It was going to be a real slam-bangin' race!

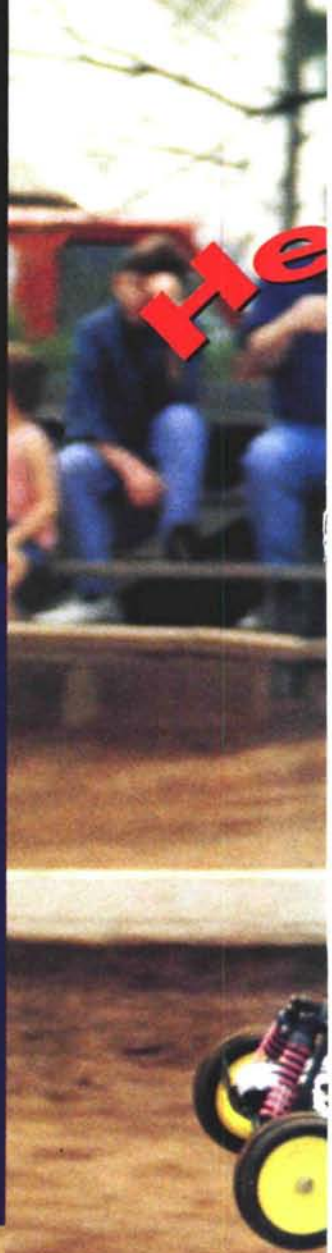
Held at the Scale Racing Sports Raceway in Tempe, AZ, the race started on Friday, March 19 with open practice. The drivers' stand was constantly packed; there were as many as 18 cars on the circuit at a time. Of course, with more than 300 drivers entered in the race, you would expect the drivers' stand to be a busy place.

This race was important to many people. There were drivers from many states: California, Nevada, Texas, Illinois, Alaska and Hawaii. I've been to National races that didn't pull racers from that far! Of course, management was the key to this success.

Standard ROAR rules were used for all classes, and the Stock Class was limited to 24-degree ROAR-legal motors. Speaking of stock stuff, this was a race of stock cars. Amazingly, almost all of the topnotch drivers were working with out-of-the-box vehicles. It just goes to show you that today's bone-stock racing vehicles have what it takes to win a major race.



Cact



at Wave Warriors

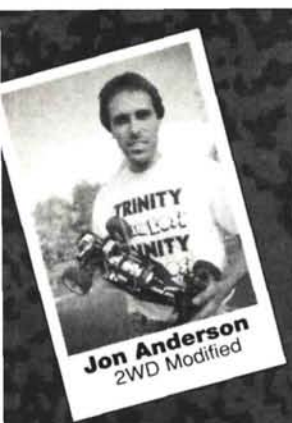


(Left to right):
Perry Gaubatz,
Paul Linke
and Karsten
Aagaard dis-
play their win-
ning Concours
cars.



us Classic

by MIKE LEE



Jon Anderson
2WD Modified



Steve Butts
Truck Stock



Rod Hughes
4WD Stock

CACTUS CLASSIC

In qualifying, the track was at its best for the early rounds. Owing mostly to the large number of cars entered, many drivers placed their best runs in the first or second qualifying rounds. With so many cars, there was little time to waste, so the track wasn't fluffed up between rounds. This resulted in deep holes and a rutted surface, making traction difficult at high speeds.

As for TQ times, James Gallatin was on the pole for the 4WD Stock Class with a 14-lap, 4:09.5 run. He was followed by six drivers who were only five seconds slower. The 2WD Stock Buggy Class had some fast guys, including Rich Trujillo, who turned in a 14-lap time of 4:16.

In the 4WD Modified Class, Mark Francis was cooking when he posted his top time of 4:15 for 15 laps—just shy of a lap ahead of the Stockers. In 2WD Modified,

can/endbell Epic motors under the Trinity and the Precision Motorworks labels. Associated had quite a few Yokomo-label motors in the crowd, and a handful of HPI motors was also seen. It was incredible how some of these guys were gearing the 24-degree motors with the super magnets in them. Some trucks had final-drive ratios of 9-to-1, and some buggies, 7-to-1. I guess I'm used to shorter, tighter tracks.

Pins and mini-pins were the choice for rear tires, and, up front, ribbed tires with one rib cut out were used. The Pro-Line XTR compounds were very popular on the track, as they afforded road-car handling in a dirt environment. Schumacher had some tires that handled well on the track, and Losi front ribs were the top choice in the Truck Class.

There was also a good mix of cars in the

4WD STOCK

Fin	Qual	Name
1	3	Rod Hughes
2	8	Mark Shaw
3	5	Joe Martin
4	4	Daryl Reich
5	7	Aldo Ruiz
6	10	Dale Bates
7	1	James Gallatin
8	2	Brian Burton
9	6	Troy Messina
DNS	9	Scott Spear

4WD MODIFIED

Fin	Qual	Name
1	1	Mark Francis
2	5	Scott Anfinson
3	3	Brent White
4	2	James Brown
5	8	Jeff Whitman
6	6	Steve Nelson
7	9	Tom Leman
8	10	Scott Roberts
9	7	Don Graham
10	4	Randy Joslin

2WD MODIFIED

Fin	Qual	Name
1	1	Jon Anderson
2	9	Matt Francis
3	2	Scott Anfinson
4	6	Mike Dunn
5	10	Scott Roberts
6	5	Steve Chamberlain
7	3	Jack Johnson
8	7	Kyle Reed
9	8	James Brown
10	4	Steve Nelson

2WD STOCK

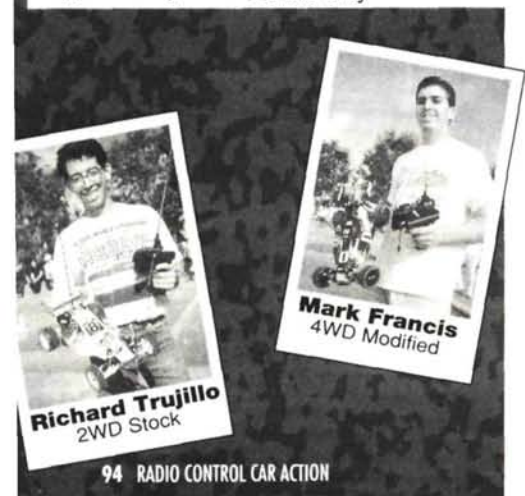
Fin	Qual	Name
1	1	Richard Trujillo
2	7	Todd Handel
3	6	Chuck Erickson
4	3	Richard Lake
5	2	Jayson Pang
6	9	Randy Joslin
7	4	Bill Siler
8	5	Zeb Portanova
9	10	Joe Morettini
10	8	Donald Gray

TRUCK STOCK

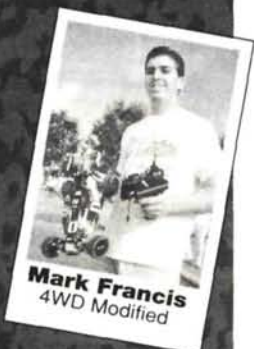
Fin	Qual	Name
1	1	Steve Butts
2	2	Chuck Erickson
3	8	Jerry Walter
4	5	Brent Thielke
5	4	Billy Caley
6	10	Jeff Tonkin
7	7	Marc Vadivieso
8	9	Craig Evans
9	6	Pat Kivin
10	3	Mike Rich

TRUCK MODIFIED

Fin	Qual	Name
1	1	Jon Anderson
2	3	Jack Johnson
3	9	Bryan Peterson
4	2	Matt Francis
5	5	Mike Dunn
6	6	Kyle Reed
7	10	Chuck Erickson
8	8	Steve Dunn
9	7	Burrito
10	4	Greg Hodapp



Richard Trujillo
2WD Stock



Mark Francis
4WD Modified

TQ Jon Anderson completed 14 laps, with a 4:06.4 time, and he ran the same time in the Modified Truck Class.

In the Stock Truck Class, Steven Butts really turned up the heat; he ran a pole-sitting time of 4:16.11 for 14 laps. Now, that's fast for a stocker! In fact, that time would have landed him in the Modified B-Mains of truck and buggy.

While touring the pits, we noted some drivers' choices of running equipment. In the Stock Class, there were many green

field. The Losi group ran their latest Pro-SE buggies and LX-T trucks, and the factory rides sported the Hydra-Drive clutch coupled with the new Losi Double-X tranny.

Schumacher was out in force with the latest Cat series of cars and trucks. Scoring well overall, they had a vehicle in virtually every class of competition. Traxxas was also making a strong showing with buggies and trucks. The only major manufacturer *not* out in full force was the Associated team. Several Associated-sponsored drivers were

in competition, but the big hitters such as Beckwith, Lett, Pavidis and Kinwald were notably absent.

As for new technology, there was little to be seen. What was more noticeable was the use of stock equipment to make the cut. Jon Anderson placed his Losi Pro-SE buggy and his Losi LX-T truck on the pole in both classes, and he used virtually no after-market parts on either chassis. Richard Trujillo had some after-market parts in his stock pole-sitter, but nothing that radically changed the

Thanks to Pro-Line, the Cactus Classic was a success of monstrous proportions. You had better make plans right now for the 1994 running of the hottest race without a Nationals title.

car. It just goes to show you that you no longer need megabucks to win—just well-tuned, out-of-the-box cars that are cared for...regularly!

The last qualifying round was held on Sunday. The track surface had become hard-packed and heavily rutted. Tires were being worn out in short order, but you have to expect this kind of wear and tear at any major event. The "last chance" qualifier didn't change much overall, because most of the drivers made their best runs when the track was primo. The Mains were finally underway.

THE MAINS

• **4WD Stock.** Rod Hughes took a new Tomy Intruder to the top spot with a convincing finish, four seconds ahead of his next competitor. His Tomy car ran smoothly all the way and was challenged only at the start by James Gallatin, who held the lead for the first half, but then bobbled and let Hughes by to lead for the rest of the race. Second place went to Mark Shaw, who was chased by Joe Martin and Daryl Reich on the final two laps. No dice for the challengers; this was the way they finished.

• **4WD Modified.** This was a race of sheer horsepower. The top 10 drivers were separated by only seven seconds going into the Main, with Mark Francis taking an Associated/Yokomo to the pole. Francis took the lead just after the start and stayed there for good. The rest of the pack was caught in a little "dust devil" that circled the track and finally spit out Scott Anfinson and Brent White in the second and third spots. Anfinson's car was probably the fastest of the bunch, but he got hung up too many times to catch the leader. White was cool

THE TRACK

THE TRACK IS well laid out with plenty of fast areas and lots of tricky spots to contend with. In front of the drivers' stand, you begin on a short straight. You then encounter a large tabletop jump, and, on landing, you must ease up on the brakes to prepare for a 180-degree left turn. On the throttle, you hit another jump—this time, a deep double. Again, when you land, ease up on the brakes for a right 180, and then head toward another double; this one is just a little wider and closer to the next turn.

This 90-degree left turn takes you up a mild hill, where you encounter a sweeping 160-degree left. This aims you downhill, where you hit a lip jump and drop the brakes for a tight, right-hand dogleg. There's plenty of room, but that just allows the other cars to zap by you on the inside.

As you pour on the power, you encounter the moguls, which are horrendous. Four rows of these monsters stand between you and the next turn, and once you're clear of them, you take



a left sweeper into the split straights. The inside lane has two lip jumps, while the outside lane is smooth, but longer. These lead back to the starting line in a sweeping left, with a broad jump right in the apex of the turn. On the inside fast lane, you have to back off for the turn, but on the outside smooth lane, you can banzai at full tilt. Here, you can make up some serious time.

under fire and settled for the third spot.

Francis was one of the few drivers who had made many of the components for his car, converting it from the "factory" issue



(Left to right): Mike Dolan; Todd Mattson of Pro-Line; Scott Anfinson; and Tim Clark of Pro-Line stand behind the tower of trophies that were awarded to the drivers.

type that we mortals have to buy. Very little of the car was stock, and even the suspension arms were handmade parts. It took a lot of work, but it won.

• **2WD Stock.** Richard Trujillo took the pole position and never let go. He was challenged all the way: Jayson Pang, Todd Handel, Richard Lake and Chuck Erickson were hot on his trail. Trujillo watched the rearview mirror as the four clawed their way past each

other, only to tangle and fall back. Erickson made the biggest move, but he had to settle for third. Handel took second, and Trujillo never had to worry about first.

We also found our youngest driver, Ryan Maifield, in the Stock Class. Only six years old, he held his own against eight other drivers and was passed only by Mario Vasquez. Ryan captured second in his Main. He did a great job!

• **2WD Modified.** The Losi factory effort paid off, and Jon Anderson dominated the event. He not only sat on the pole, but he also ran away with the Mains. Once he had cleared the first turn blues, he backed off and took nothing but the conservative lines around the track. Matt Francis posed the only challenge. He disposed of Scott Anfinson and had Kyle Reed in the chase, but he eventually jumped up to put the pressure on Anderson. Anderson hit a corner and allowed Francis to make it interesting, but Anderson shut the door for good.

Anderson's Losi Pro-SE, which was in near-box-stock condition, was powered by a Losi 13 triple and sported Losi ribs up front and Pro-Line XTR pin-spikes in the rear. There was nothing special in the car—just good, clean driving and lots of TLC.

• **Truck Stock.** Steve Butts blasted his way to the win. This was his first major win with his box-stock Traxxas truck. Erickson captured second with five seconds on third-place

(Continued on page 146)

TROUBLESHOOTING

by FRANK MASI

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, Radio Control Car Action, 251 Danbury Road, Wilton, CT 06897. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

Striptease

I have a problem with my Traxxas Pro tranny. The drive gear keeps stripping. I've already used two gears. I ordered one from a local hobby shop; I thought it was going to be made of brass, but it wasn't. I run a Trinity Slot Machine motor.

TOP GEAR NO. 3195

I also have a problem with my Novak 610 RV. Whenever I want it to operate forward, it goes backward, and when I want it to go backward, it goes forward. Could you please help? Keep up the great mag.

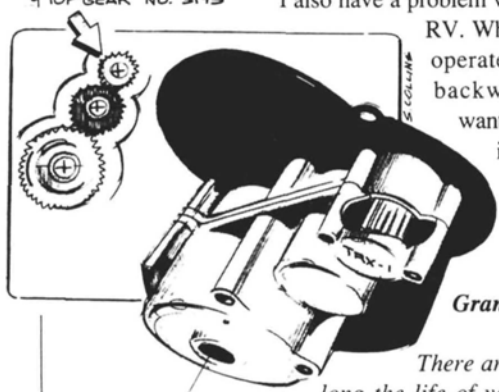
Jason Gallik,
Grand Junction, CO

There are two ways to prolong the life of your transmission's

top gear. First, make sure that you grease the gear using either the silicone lube that comes with the kit or a comparable lube. Don't use a petroleum-based lube, because it will attack the plastic. Also, if you've set your slipper clutch too tight, the top gear might become stripped owing to excessive shock caused by landing from jumps or by traveling over large bumps. Ideally, the slipper should be set so that, when it's on the running surface, the vehicle will slip about two feet.

If this stripping problem persists, you can replace the gear with the steel one from Traxxas' Nitro Hawk (part no. 3195). This is the only alternative because Traxxas no longer offers a brass top gear.

As for your speed controller, check to see that you've hooked up the ESC to the motor properly—red lead to positive, blue lead to negative. Does everything look OK? Then move on to your transmitter. Look for a servo-reversing switch (almost every radio has one), find the one for the throttle channel, and flip it to reverse. That should solve the problem.



Pipe Dream

About two months ago, I purchased a Kyosho Nitro T-Bird. I'm now thinking of adding a tuned-exhaust system and/or a slide-valve carburetor. I know that the slide-valve carb is for low-end power and speed, and that the tuned exhaust is for top end. I would like to know if this setup will cause them to impede each other. If you could help me, it would be greatly appreciated! Great magazine.

Bruce Blaine, Mays Landing, NJ

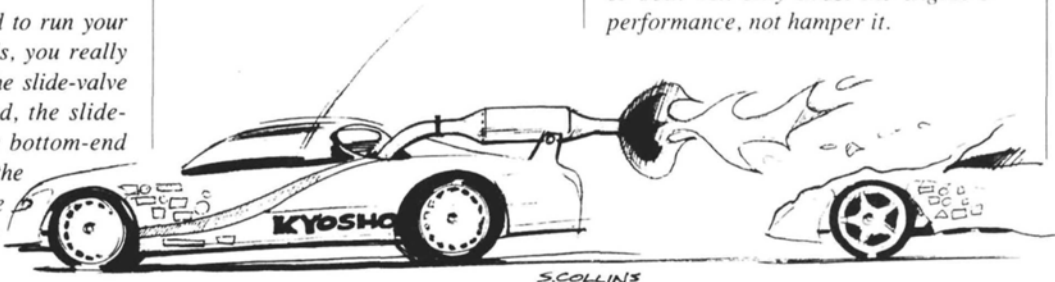
Well, Bruce, if you intend to run your T-Bird primarily on ovals, you really won't need to invest in the slide-valve carb. As you've surmised, the slide-valve carb enhances the bottom-end punch and the power of the engine, which will have very little effect on the

car's top-end performance—the prime consideration of the oval set.

A tuned-exhaust system is the way to go for serious oval performance. There are several models available from Duratrax. The tuned-exhaust system (part no. DTXG1100) contains both the header and the pipe. You could also purchase the Duratrax header separately (part no. DTXG1101) and use any pipe, such as that from Paris Racing, or Duratrax's Performance Mini Pipe (part no. DTXG1102). If you want to

mount the pipe so that it faces forward on the chassis (installing the pipe in that fashion keeps it lower and enhances the car's handling), you'll have to cut the header and turn it upside down. This method is recommended for the Paris or Duratrax mini-pipe. The Duratrax tuned-exhaust system is designed to be mounted on the shock tower.

For overall performance enhancement, both the pipe and the carb would be beneficial. And using either or both will only boost the engine's performance, not hamper it.

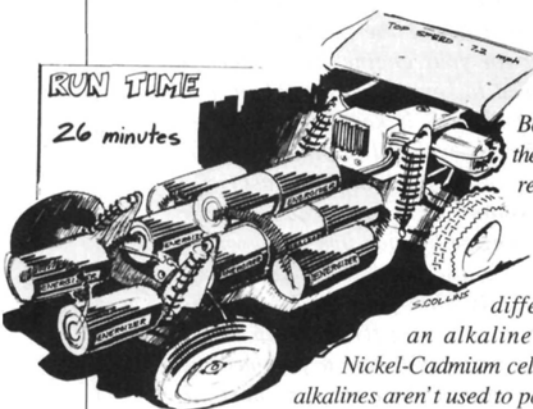


Still Going

One day I came up with an idea: how come no one uses Duracell or Energizer alkaline batteries to make their battery packs? I mean, just go down to the nearest department store, buy some, and solder them together. For someone who's into racing, I think the little extra money is worth it. Is it legal to race alkaline batteries instead of Ni-Cd cells? Not long enough run time or not fast enough? What?

I have another question. I own a MRC RB-465 charger, and I want to know how to peak a battery with it. It has a meter, but I don't know how to use it. I know you can peak a battery pack by its warmth, but how do you use the charger's meter? Do you think my charger is out of date and I should get another? Your advice would be helpful.

Ben Rhoads, Emlenton, PA



You've asked a very interesting question, Ben, and yours isn't the only letter we've received on this subject. Chemical composition aside, the major difference between an alkaline battery and a Nickel-Cadmium cell, and the reason alkalines aren't used to power R/C cars, is resistance.

Although the typical alkaline battery can have as much as two or three times the capacity of a comparable Ni-Cd, its internal resistance is many times greater. What good is all that energy if you can't get it out quickly? Look at it this way: say you have two 55-gallon drums, each filled with the same amount of water. In one drum is a hole the size of a dime, and in the other, a hole the size of a Frisbee™. From which drum will the water flow out more quickly? The one with the larger hole, of course. Hooked up to your car's electric motor, the alkaline battery won't make it go very fast, but the motor will operate for a longer period. The Ni-Cd is able to pump much more current into the motor, making it run faster, but for a shorter period. Also, don't forget that, owing to its chemical components, the alkaline battery isn't rechargeable, so you would have to buy new cells after each run.

Unless your charger has output jacks to which you can attach a voltmeter, you're limited to the "feel" method of peaking your battery packs. The ammeter on the front of your charger reads only the output, in amps, that is flowing into your pack. If you can hook up a voltmeter, you'll be able to monitor the pack's voltage. When the charging voltage peaks—or levels off—then starts to decline, you'll know that your pack is fully charged. When you use this method, however, it's always recommended that you hold the battery pack to detect any excessive heat—a sure indication of an overcharge.

Ratio Days

I own an RC10 with a Stealth tranny, a Novak 410-M5 ESC, a Sanyo 7-cell, 1700mAh SCR battery, and a Trinity 13-turn, quintuple-wind, Tri-Rotor motor. All of the other letters I've read have said something about how to gear your car, but I just don't get it! I have a 23-tooth pinion gear and a 90-tooth spur gear on my car. Which gears should I use?

Also, when I run my car, it lasts only for 1½ to 2 minutes. Then, when I feel the speed controller, it's burning up. The motor and the battery are just fine, with no heat. Is it the battery? The speed controller? Is it something else, such as the gears or the motor? Please help!

David Smyth, Port Orchard, WA

Besides the type of motor and battery you're using, there are other factors to consider to determine a proper gear ratio. One is the type of surface on which you'll be running; is it made up of loose, fluffy dirt, or is the surface hard-packed? You can use a lower gear ratio, i.e., a lower final-drive ratio, (bigger pinion gear) on a hard-packed track than you can on a loose track. Why is this? On the fluffy track, to provide the necessary traction, you have to use tires that penetrate the surface. But tires that work on hard-packed tracks tend to "scrape" the track for adhesion.

The second factor that warrants consideration when selecting the correct gear ratio for a given motor is the configuration of the track. You'll need to gear your car higher (use a smaller pinion gear for a higher overall gear ratio) on a track that has many tight turns and few straights. On a large, sweeping track, you'll be able to gear the motor lower to achieve higher top-end speed on the straights.

As far as your specific gear ratio, I recommend that you try installing a 19- or 20-tooth pinion gear on your motor. Your present gear ratio works out to approximately 8.8:1 (90-tooth spur divided by the 23-tooth pinion, multiplied by the Stealth's output ratio of 2.25). Using the 19-tooth pinion yields a final ratio of approximately 10.7:1, which is much higher, and will help extend your car's run times substantially. It's also important to note that your motor's condition will affect its efficiency and, hence, its run times. Be sure to clean your motor frequently and to change the brushes when they become worn.



Flabbergasting Flywheel

I've recently been purchasing parts for my Outlaw Rampage. I bought it used from a local hobby shop and began hopping it up. When I assembled the flywheel, the clutch and the pilot shaft to the engine, my problem began. The Rampage flywheel comes with a spacer that goes behind it. When I use this spacer, the clutch and the main gear don't mesh properly. It puts the engine in a bind. When I don't use the spacer, the flywheel scrubs the chassis. I've put a smaller spacer behind the flywheel (a bushing out of my rear hub) and the gears mesh well, but the spacer drills a hole in my throttle servo. The way it is now, I can't use a brake because there's no room for it. Please help. I want to race my truck at a local track, but as you know, a servo with a hole in it and no brake are not exactly racing accessories.

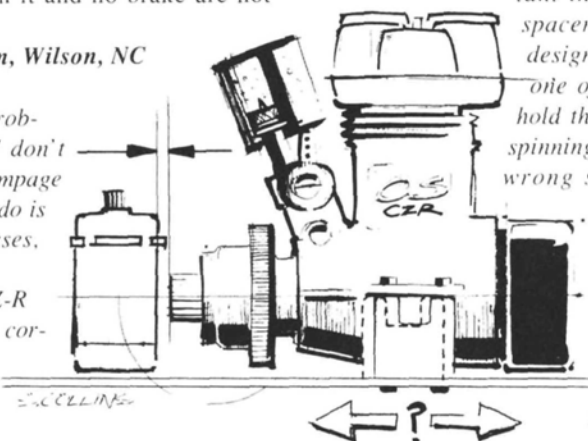
Chris Pearson, Wilson, NC

Yours is a very perplexing problem, Chris, mostly because I don't actually have your Outlaw Rampage in front of me. The best I can do is to make a few educated guesses, so here goes.

If the Rampage's O.S. CZ-R .12 engine has been installed correctly, its clutch nut will end approximately 1/8 inch from the throttle servo. Yours

isn't, so let's try to determine where the problem started. Excluding the possibility that your truck's previous owner modified it extensively, your engine could only be making contact with the throttle servo if the engine has been installed incorrectly on its mounts, or if the mounts themselves have been installed backward on the chassis. To find out if this is the case, detach the engine from its mounts, then remove the mounts from the chassis. The holes in the mounts should be offset slightly. Re-install the mounts on the chassis in a position the opposite of their previous position and bolt the engine to them. Your engine's clutch nut should then clear the throttle servo.

If the engine mounts have been installed properly, turn your attention to the flywheel assembly. First, it's important that you use the proper flywheel spacer for your engine. The spacer is designed to key to the crankshaft, and one of its ends is knurled to securely hold the flywheel and to prevent it from spinning on the crankshaft. By using the wrong spacer, you could damage the engine bearing and the flywheel. It's also possible, though unlikely, that your engine has the wrong flywheel, in which case you'll have to purchase the correct piece (Kyosho part no. FD-49, or Tower Hobbies part no. KYOC3537).



Sticky Suspension

My RC10 Team Car has recently been updated with RCPS titanium turnbuckles. I put the stock ball ends on, but when the car goes full left and the left shock is moved upward (as when the car hits a bump while turning), the ball ends hit each other, and this prevents the arm from coming back down. I'd like you to help me. Thanks. (Oh, yeah, I just subscribed to your magazine—cool!)

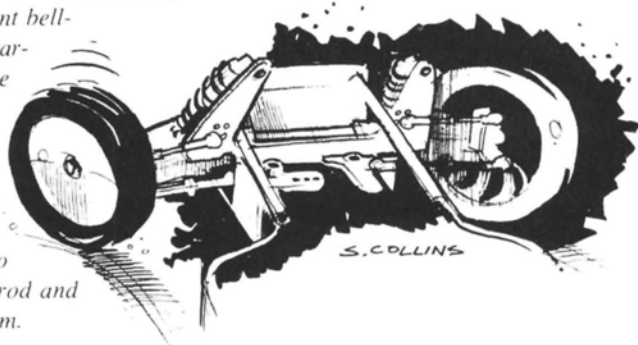
Conley Still, Anchorage, AK

Switching to the RCPS tie rods shouldn't have any effect on your car—other than making it lighter and stronger. The turnbuckles could be causing the problem only if their adjustment nuts, which are larger than those of the stock tie rods, are getting caught.

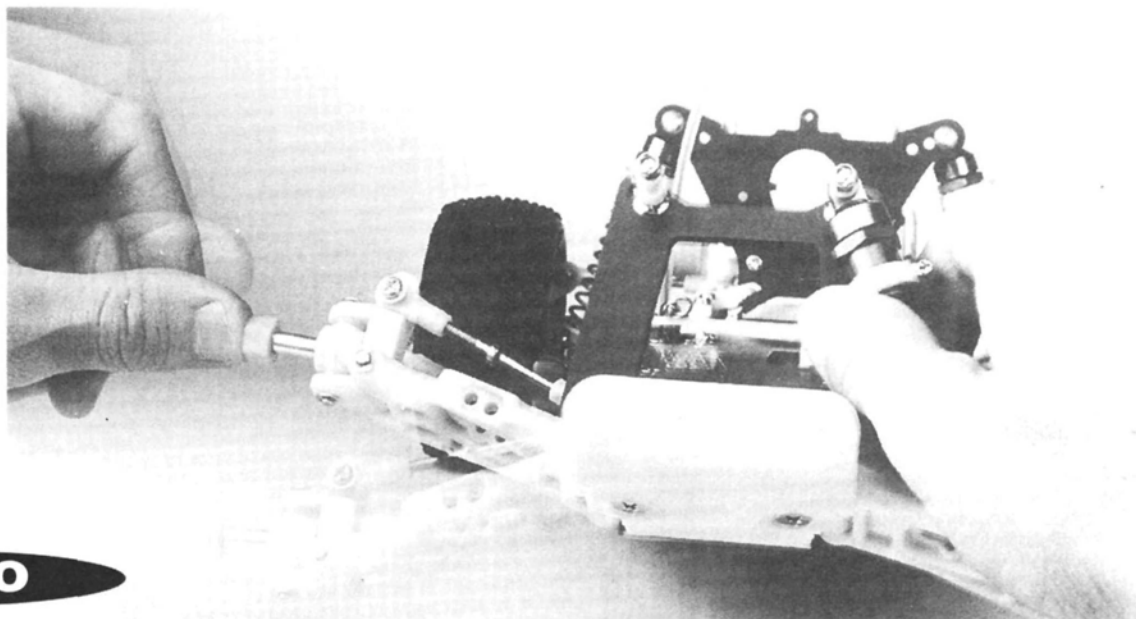
After careful examination of a Team Car that also had RCPS rods installed, however, I came to the conclusion that this is probably not the case.

So what's causing the binding? After-market steering bellcranks might be responsible, because they could place the inner steering rod's mounting point higher than that of the stock bellcranks. The stock steering setup places the tie rods where they won't rub against each other. Altering this by using different bellcranks will cause clearance problems like those you've experienced. Some RC10 owners place washers under the steering bellcranks to alter steering geometry. This also raises the steering rod and causes the same problem.

Using caster blocks that have 15 degrees of caster or less might also be causing the tie-rods to bind. Although all the newer Team Car kits come with 30-degree caster blocks, older kits had 15-degree blocks. Check to see which kind your car has. Replacing them should eliminate the problem and allow your car to steer better in the bargain. ■



With the shocks removed, the suspension arms should "flop" on the pivot pins when they are lifted and released.



PHOTOS BY WALTER SIDAS

HOW TO Suspension set-up

Bumpy Basics

by Mike Lee

THE KEY TO a competitive car is handling. Handling is determined by the car's suspension setup and weight distribution. In this article, we'll show you how to give your suspension an edge before you hit the track. This way, you'll have a head start on fine-tuning the suspension for the ride you want.

Of most importance to any car's suspension system, whether for on-road or for dirt, is proper assembly. An improperly built suspension will hamper your car's performance. Follow the instructions to the letter, and don't make changes just because your friends do it differently. Remember, engineers spent many hours designing these cars, so trust them.

THE "FLOP" TEST

Make sure that the suspension components fit correctly. For example, an off-road buggy's A-arms must be able to move freely (without the shocks installed, of course). To make sure that they do, I do the "flop" test: when the chassis is turned upside-down and then right-side up, the arms should simply flop on the pivot pins. If they don't, you might have to shave some material off the arms to free them. If the arm's hinge pins

are binding, ream the hinge-pin holes slightly with a drill bit that's the same size as the pins, or put the hinge pin in a drill and polish its surface as it spins.

POLISHING PIVOT BALLS

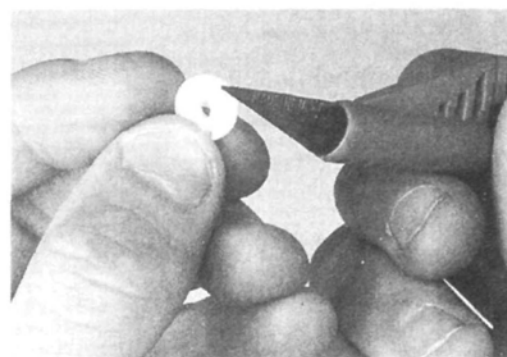
With on-road cars, the pivot balls on which the T-bar is mounted are critical. They must move freely in the ball mounts, but without slop. If they don't, run a 4/40 screw into the pivot ball and put the screw into a drill. With the drill running at low speed, put polishing compound on the ball and then hold a rag against it. Cook for a minute or two and wipe clean. This should do the trick.

BUILDING SUPER SHOCKS

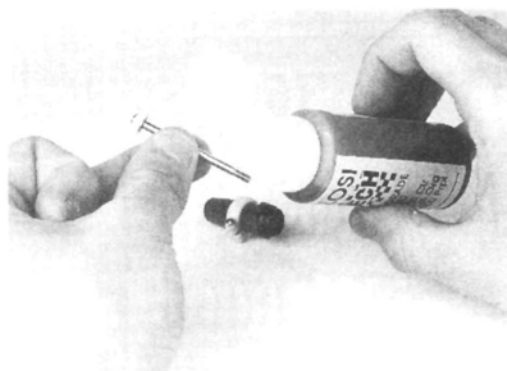
Shock absorbers are also critical. There are a couple of points to watch when you assemble the common, oil-filled shock. The first is the shock piston—the plastic disk that hangs at the bottom of the shock shaft, remember? Many times, I've found that the piston has flashing left on it, and this can cause the piston to move roughly in the shock body, and provide inconsistent shock action at best. Carefully trim away any flashing with a sharp razor blade or a hobby knife.

I also round off the edges of the piston with 400-grit sandpaper. This allows the piston to move smoothly inside the shock body at all times.

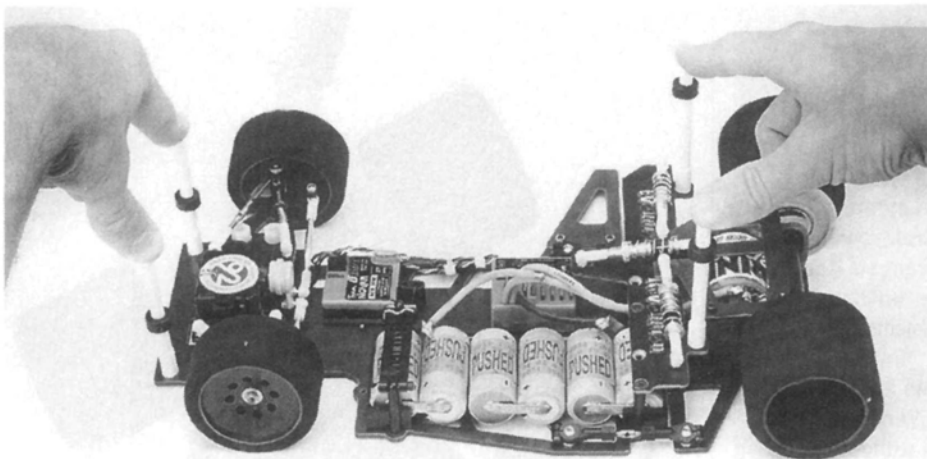
The next step in the shock assembly is the seals. You must be careful to slide the shock piston shaft past the seals without damaging them. The best way to do this is by lubricat-



Carefully trim away any flashing from the shock piston with a sharp razor blade or a hobby knife.



The best way to slide the shock shaft past the seals without damaging them is to lubricate the shaft with shock oil (preferably the same type you'll use to fill the shock).

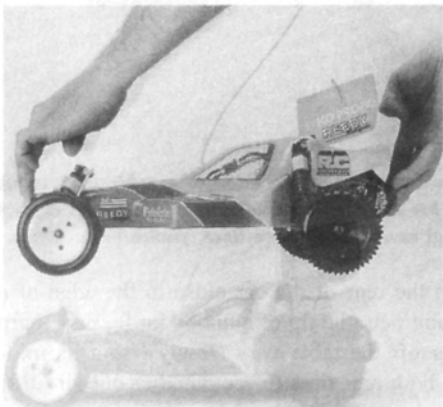


Push down on the suspension at all four corners, and make sure that nothing binds or catches on the moving suspension parts.

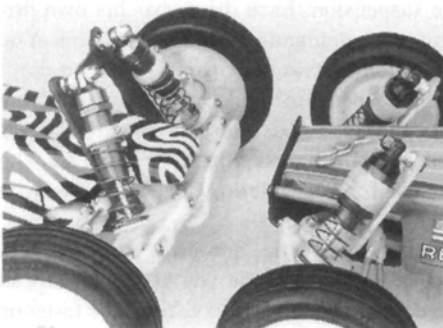
ing the shaft with shock oil (for best results, use the same type of oil that you used to fill the shock). When you install the shaft, *ease* it past the seals. Never jam the shaft past the seals, or they'll be history.

THE "PUSH" TEST

With the car fully assembled and the radio



To set the ride height of an off-road vehicle, drop the car from a height of approximately 6 inches, and let the suspension settle.



To adjust the ride height of most off-road vehicles, the shock's spring tension must be altered. This is usually accomplished by raising or lowering a clamping spring collar that surrounds the shock's body, or by adding or removing a spacer.

equipment—with battery—in place, put the car on a table. Push down on the suspension at all four corners, and make sure that nothing binds or catches on the moving suspension parts.

The push test is also important for off-road cars and trucks, because it will tell you if each corner is working independently. For on-road cars, the test works for the front end, but not for the rear end, because of their solid rear-axle design. Instead, each rear wheel affects the other directly. In this case, just pick up the wheels, one side at a time, and make sure that the suspension works equally for both sides.

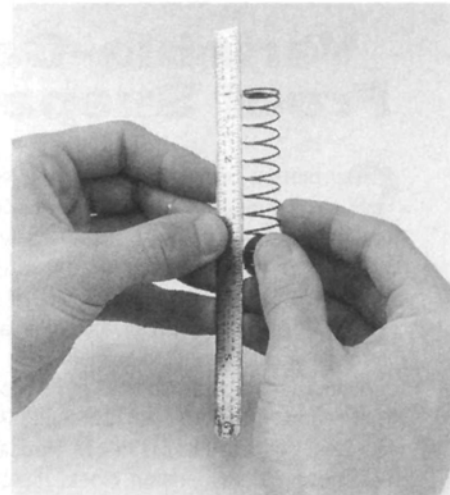
TRAVEL TIME

Now it's time to set the suspension.

• **Ride height.** An off-road car's suspension must allow the tires to absorb bumps and roll over holes and depressions. A vehicle's ride height is set correctly when, with its suspension settled, its wheels can travel upward and downward.

To set the ride height of an off-road vehicle, it must be at its full running weight, i.e., all of its equipment (batteries, electronics, etc.) must be installed. Drop the car from a height of approximately 6 inches, and let the suspension settle. Look at the car from the rear, the front and the side. How much ground clearance does the car have? At what angle do the suspension arms rest? When viewed from the side, is the chassis level, or is it at an angle? Most cars and trucks perform their best at a specific ride height. Instruction manuals often tell you how to set ride height. You can also ask other R/C enthusiasts for advice. If they run the same type of car as you, just copy their setup (at least, for starters).

To adjust the ride height on most off-road vehicles, the shock's spring tension must be altered. This is usually accomplished by rais-



Measure pairs of springs to ensure that they're the same length. Mismatched springs will impair the car's handling.

ing or lowering a clamping spring collar that surrounds the shock's body.

• **Ground clearance.** My final test on the off-road cars is to measure the chassis' ground clearance—the distance from the chassis to the surface on which it rests. In this case, I'm checking to see whether one side of the chassis is lower or higher than the other side, because this would indicate that the coil-over springs aren't balanced. When one spring has more tension on the shock than the spring on the opposite side, the chassis will "roll" toward the softer spring, and the "soft side" of the chassis will be closer to the ground.

One way to fix this is to measure the length of the springs and ensure that they're the same. Another, quicker, way is to use spring spacers, such as those made by RPM*. If you have the same combination of spacers on each shock, you're virtually assured of the same spring tension for each spring.

For my on-road cars, I use a "tweak board" (see "How to Make Your Own Tweak Board" in this issue) to set the suspension. This device allows you to load each wheel with the same amount of weight. It's easy to use; just center the car on the board, settle the suspension by bouncing it downward a couple of times, and look at the bubble level indicator on the teeter bar. If the bubble isn't centered, the balance is off. You then use tweak screws or suspension springs (whichever your car uses) to balance the car until its weight is equally distributed. This system is used by those who race full-size cars, but they put a scale under each wheel and then compare the weights.

An older method of checking tweak is to point-balance the car. To do this, make a mark on the car's rearmost cross support—usually the motor pod's lower brace. This point must be exactly at the middle of

Variable-Caster Front Suspension

Current on-road cars have one of several types of front suspension system: Associated's nylon wheel mounts/suspension blocks; the "Delta-type" front-axle beam; Bolink's plate front suspension; and Advanced Racing Technology's dual-plate suspension are a few. Until recently, only the Bolink front end allowed camber adjustments as well as basic caster adjustments to be made.

Associated* has broken out of its mold with a totally new front end for the RC10L, RC10LSS and RC12LW cars. On this new front suspension, caster can be changed without having to remove the suspension block. It also allows immediate camber changes and variable-caster suspension movement.

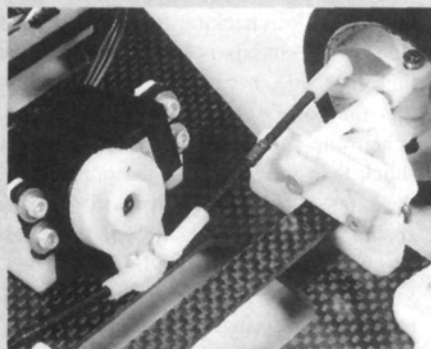
Trinity* has also jumped into the variable-caster front-end market with its own bolt-on—the Evolution 10 RCS front end. It has a carbon-graphite lower arm and fully adjustable links. The upper links provide an infinite number of camber, caster, damping and roll-center settings

Variable-caster suspension allows a car to handle corners better. The old saying "Caster is faster" holds true—as long as you're entering a turn. Unfortunately, it's better to have *less* caster coming

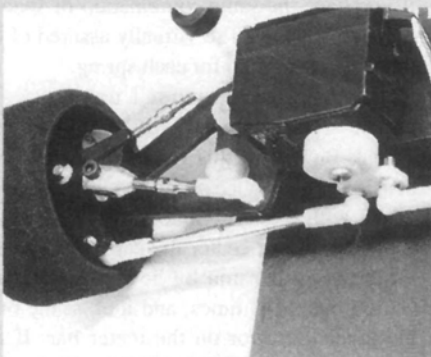
out of a turn, because less caster allows better traction. Variable-caster suspension allows a car to enter a corner with a fairly high degree of caster for a fast entry. As the suspension is compressed downward, the suspension system reduces the caster in the suspension arm. This allows the tire to maintain a high degree of traction through the entire turn, so the car can exit the turn more quickly.

Associated's new front end can provide up to 2 degrees of caster change during suspension travel, and this is quite a lot. Overall, this front end can provide static caster settings from +4 degrees to -10 degrees. On Trinity's new front end, caster change during suspension travel is adjusted by the number of shims that you put under the rear link. The static caster settings are also fully adjustable; you just alter the length of the links.

With these new front suspension designs, you should be able to cure any "push" problem!



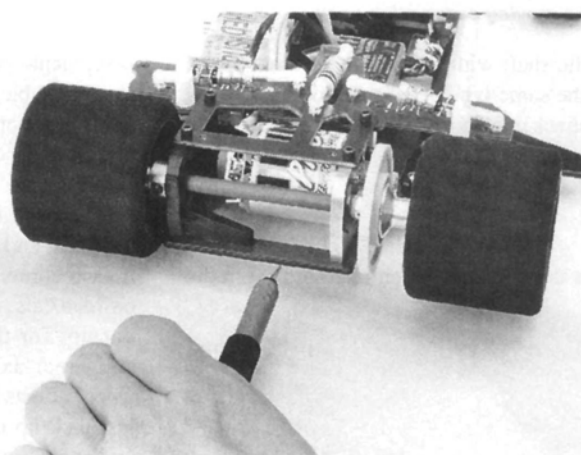
Associated front suspension



Trinity front suspension



To check tweak, make a mark in the center of the car's rearmost cross-support.



Then, put the rear of the car close to the edge of a table and, using the tip of a hobby knife, lift the rear off the table very slowly. If both wheels rise off the table at exactly the same time, you're in business.

the car's rear. Then, put the rear of the car close to the edge of a table and, using a ballpoint pen, the tip of a hobby knife, or a sharp screwdriver, lift the rear off the table very slowly (from its midpoint). You must watch both rear tires to see whether one tire lifts off before the other. If it does, there's a weight imbalance, and you must adjust the tweak to correct the problem. If both wheels rise off the table at exactly the same time, you're in business.

FINE-TUNING YOUR SUSPENSION

It's time to fine-tune the suspension. Each driver has his own driving style and makes his own demands of the suspension. You have to start with a suspension that works correctly, or you don't stand a chance. When the suspension works correctly, selecting tires, springs, oil weights and shock position is a breeze. There's no other way to make it happen, unless you have a friend who knows how to set up the car for you. (Hello, Cliff Lett? Can you do mine, pleeeeaase?!)

Get that suspension working correctly, and do it from the very beginning. If you have to, take down the one you have and start all over. Do it by the book, and make sure it all works. You'll be faster on the track.

*Here are the addresses of the companies mentioned in this article:
RPM, 14978 Sierra Bonita Ln., Chino, CA 91710.
Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.
Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036.

SCOPING OUT

SCI VIPER

by JOHN RIST

VIPER! EVEN ITS *name* strikes fear into the competition! SCI Power Corporation* recently introduced a programmable, microprocessor-controlled, top-of-the-line, electronic speed controller (ESC) just for all-out racing. Its programmable features include transmitter-setting matching, current limiting (punch control) and a choice of high- or low-frequency motor drive (unique among programmable ESCs).

If all is going well, it's best to run the Viper in the high-frequency mode. It provides incredibly smooth throttle response (especially at the medium to slower speeds), your motor also runs cooler, your armatures suffer less from wear, and you have longer run times. But if mysterious glitching is destroying your chances of winning, or the electronic lap counter is missing some of your laps, it's easy to switch the controller to low-frequency motor drive. This may well reduce noise enough to minimize the glitching and make sure that your laps count.

Another neat feature is a test point that enables you to accurately set the current-limiting function. On other ESCs, an approximate limit can be set by watching the intensity of an LED, but it's virtually impossible to achieve accuracy by doing this. To eliminate this problem, SCI added a white-wire "test point" to the Viper. Now, after you have found that "just-right" setting, you can measure and record a voltage level at the current-limit test point and adjust it upward or downward by monitoring the test point with a digital voltmeter.

I knew that I was in command of a full-blown, forward-only racing ESC with:

- brakes;
- 11 FETs to handle the power (nine for forward and two for brakes);



- 5- to 10-cell Ni-Cd capacity;
- six programmable functions: full-throttle point, neutral point, brake point, current limiting, and high/low-frequency operation;
- built-in BEC;
- built-in pulse-checking/programming LED indicator;
- gold-plated, Tamiya-style battery and bullet motor connectors;
- SCI Multiconnector receiver connector set that can be adapted to all popular brands of receiver;
- instruction book, motor capacitor kit and SCI decals.

As usual, I opened the case to check inside. The Viper has a mixture of leaded parts and surface-mounted silicon chips. The high-current-handling parts such as the FETs have conventional leads that go through the circuit board, and all the solder joints look good. The only unusual part is the $\frac{3}{4}$ -inch brass disk that's mounted on the back of the board. I'm reasonably sure that this is a shield that prevents motor noise from upsetting the microprocessor's computing cycles. As I've come to expect from high-quality ESCs, the Viper's insides look good!

INSTRUCTIONS AND SET-UP

Good looks only count in fine paintings and CD covers, however; the "Scoping Out" lab measurements are what count.

This controller doesn't have the familiar neutral and full speed trim pots. Instead, it has a single push-button labeled "SET UP." A thorough reading of the instruction book was in order.

For the most part, the instructions are adequate. There's very little information on installation, and no mention of how to best set the transmitter functions. But the *potentially* most difficult feature—programming functions—is explained in three separate sections.

I use a Futaba Magnum AM radio, which is best set with both end-point adjustments (ATV) at 10, throttle sub-trim at zero (the midpoint) and throttle-reversing at reverse. I also set the main throttle trim to zero (the midpoint). The Viper can be successfully programmed to match a transmitter no matter what the transmitter's adjustments are, but these suggested settings give me good throttle response and control.

If you follow the detailed, easy-to-follow instructions, programming is "user friendly." When you've been through the procedure once or twice, it's almost second nature; and there's a programming "cheat sheet" printed right on the Viper's label, so losing the instruction book won't put an end to your Viper programming career.

RESISTANCE TEST

An ESC's "on" resistance is its most important feature, so I always test it first. High "on" resistance means overheating and power loss; low "on" resistance means cool operation and race-winning performance.

I always run this test twice: first, to

"SCOPING OUT" LAB AND TESTS

THE LAB consists of:

- an oscilloscope
- a digital voltmeter
- a variable-load resistor bank
- a 6V 30A electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on.

The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5W power resistors that can be switched on and off one at a time to vary the load between 0.6 amp and 20 amps, but the standard 12 amps are usually used.

In series with the resistors is a 25A Simpson current meter and a 1-percent 0.01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter's reading can be double-checked. Of course, the lab power supply provides the test current.

• VOLTAGE-DROP TESTS.

These are the first tests. It's virtually impossible to read an ESC's resistance directly, so I measure the voltage drop across it with the resistor bank set up for 12 amps of current. I then calculate the controller's "on" resistance by dividing the measured voltage drop by 12 amps. I take the voltage reading twice: along the full length of the battery and motor wires (including connectors) and 2 inches along them. The first reading helps me to determine an ESC's "on" resistance as it comes from the factory, and the second gives a standard reading with which I compare ESCs.

• LET-IT-COOK TEST.

I adjust the resistor bank to pass 20 amps of current, then I jam the throttle wide open and let the ESC pump the 20 amps.

• DEAD-SHORT TEST.

With this test, I check whether the controller can survive the heavy current caused by a jammed gear or a fried motor. No one likes to have this kind of trouble and discover that his ESC has been destroyed, too.

SCI Viper

DIMENSIONS:

Height 0.866 in.
Width 1.50 in.
Length 1.6 in.
Weight with wires 2.5 oz.

TUNING:

Access to controls Excellent
Ease of adjustment Good

PRICE:

Sug. retail price \$139
Warranty 6 months

ELECTRICAL:

(Manufacturer's specs)

Max voltage 12 volts (10 cells)

Min voltage 6 volts (5 cells)
Max current Unlisted
Continuous current Unlisted
Resistance Unlisted

TEST PARAMETERS:

Voltage 6 volts
Current 12 amps
Voltage drop, full length of wires 0.18 volt
Voltage drop at 2-inch point 0.08 volt
Resistance* to end of wires 0.015 ohm
Resistance 2 inches along wires 0.006 ohm
BEC voltage, 6-cell pack 5.01 volts
*Resistance = voltage drop / current

COMMENTS: SCI of Austria has come to the USA with its first high-frequency, programmable speed controller. It's mean as a snake and is named accordingly—Viper. As with all the SCI controllers I've tested, this one is easy to set up and operate—quite a feat for a programmable controller. Some brands are impossible to program without having the manual—not so with the Viper. When you've followed the detailed steps in the instruction book once, you know how to do it. And there's a "crib sheet" right on the Viper's label.

As well as the usual programmable features (transmitter matching and punch control), it also offers both high- and normal-frequency motor drive. You'll usually stay in the high-frequency mode, but if you're experiencing radio interference or auto-count problems, switch to the low-frequency mode. Its lower electrical noise might save the day. The Viper is small and light enough to fit in most cars, buggies, or trucks. If you're looking for a new trick speed controller, check out the Viper.

determine the ESC's resistance along the full length of its battery and motor wires, (including connectors, if any); second, to determine its resistance 2 inches along those wires.

It's virtually impossible to measure resistance directly in an operating controller, so, with 12 amps of current flowing, I measure the voltage drop across it and calculate the resistance with the formula:

Measured resistance along the full length of the wires was 0.18 volt—a resistance of 0.015 ohm. At 2 inches, I noted a 0.08V drop—a resistance of 0.006 ohm. This is low enough; it shouldn't slow you down at the old race track.

LET-IT-COOK TEST

I increased the current flowing through the controller to 20 amps (the average current for a 4-minute race) and let the controller cook without any cooling—no fans or heat sinks

(heat sinks aren't provided)..

After 15 minutes, the Viper was too hot to touch comfortably. While I was in this destructive mood, I placed a dead short across the motor leads. The current jumped to 40 amps (the limit of my bench power supply). After 30 seconds, the controller was hot enough to blister your finger, but it came through this abuse without skipping a beat. The Viper's innards seem able to withstand a lot of abuse and keep on running.

ON THE ROAD AGAIN

With all the lab testing finished, it was time to get down to the real fun of my job—testing the ESC in a fast, electric R/C car.

I hadn't run my RC10 Team Car for some time, so I decided to use it for the test bed for the Viper. Having read the instruction sheet once, I browsed through it again to see whether there were any installa-

tion hints that I should follow.

There was a woeful absence of a diagram showing how to hook up the Viper. If you use factory-installed connectors, you shouldn't have any problem connecting the Viper to the battery and motor. But if you plan to do some serious racing, it would be wise to replace the Tamiya battery and bullet motor connectors. If you check the "on" resistance test numbers, you'll see that there's a 2.25:1 difference between the voltage drop along the full length of the wires that included the stock connectors and the reading taken 2 inches along the wire. I like to hard-wire my motor wires and use Litespeed connectors for the battery—a convenient combination that I've found gives a hot performance.

With several 6- and 7-cell battery packs charged, I headed to the R/C Hobbies (Huntsville, AL), off-road track. My first run was with a 6-cell pack (I was hoping for an uneventful run that would give me a chance to get used to the track).

Well, a world-class driver I'm not, but with the help of the Viper's smooth operation, I was able to get my RC10 around the track most of the time. After the run, which lasted around 4 minutes, a quick check of the Viper's FETs revealed that as long as it receives adequate cooling air, it doesn't need heat sinks. Subsequent runs with 6- and 7-cell packs confirmed that the Viper keeps its cool in a moving car.

I played with the programming:

- Set the brake and throttle in the hair-trigger mode. I did this by moving the trigger only a little past center when I programmed the full-speed and brake points. With this setup, the motor slams full-on instantly, and the brakes jam on hard when barely touched. This isn't a very good setup for dirt-oval racing, but it was good for "cutting donuts" in the parking lot. With the Viper's range of programs, it should be possible to dial-in a car in to just about any track.
- High-frequency versus normal-frequency motor drive. It's quite easy to switch between the two, and the car operates in much the same way in both modes. Because of the many advantages of high-frequency motor control, however, this is the mode of choice unless you're having problems with glitching.

(Continued on page 146)



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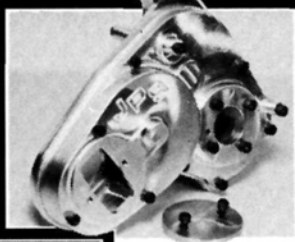
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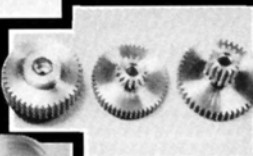
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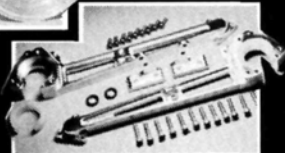
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TRAXXAS LS-II

(Continued from page 88)

feet. There's no doubt that the Point Blank motor and batteries can pack a punch.

FINAL IMPRESSIONS

The Traxxas LS-II is as good as its competition, and the quality is evident from the moment you open the box. The excellent instruction booklet not only gets you through assembly without a glitch, but it also teaches you how to set up and drive the car to victory. Forget about after-market parts, because everything you need is included. Traxxas' slogan is "The Team to Watch," but, after racing this truck, I think they should revise it to "The Team to Watch Out For."

*Here are the addresses of the companies mentioned in this article:

Traxxas Corp., 12150 Shiloh Rd., #120, Dallas, TX 75228; (214) 613-3300.

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342.

Airtronics Inc., 11 Autry, Irvine, CA 92718; (714) 830-8769.

Tekin Electronics, 940 Calle Negocio, #140, San Clemente, CA 92673; (714) 366-9016.

Point Blank, a subsidiary of Trinity Products Inc., 1901 E. Linden Ave., #8, Linden, NJ 07036; (908) 862-1705.

Litespeed, P.O. Box 4765, Spokane, WA 99202; (509) 535-2717.

Kimbrough Products, 1420 East St. Andrews Pl., Unit F, Santa Ana, CA 92705; (714) 557-4530. ■

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Ind. Cells \$ 3.25 Ea.

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This has happened to me; let's see if it has happened to you. Scene: you're on the drivers' stand preparing for your race. Your pit groupie puts your car onto the track and turns it on. Suddenly, it goes crazy and heads for the boards at Mach 9. The veins in your forehead bulge and pulsate, and you yell, "Sixty-eight! Who's on 68?" Just before your car slams against the boards and disintegrates, you yell out again, "Is anybody on 68?" But, alas, you're the only person within 100 miles who's on that frequency. You begin to wonder whether it's time to send your 6-year-old, through-hell-and-back radio to that big old impound in the sky; is it time to move on to a new, sleek, ultra-hip radio that gives the head engineers at NASA headaches? You know, one like KO Propo's* new EX-10. What's that you say? You've never heard of it? OK, then, let's take a closer look, shall we?

Man, let me tell you...this thing's bitchin'.

As long as you have the correct KO receiver, you can switch the microprocessor-controlled, 3-channel EX-10 between PPM and PCM transmission modes. It can store trim settings

KO Propo EX-10

by JOHN HOWELL

Jane! Stop this crazy thing!

for up to six models in its memory, and it has a built-in lap-timer function that can store as many as 75 lap times.

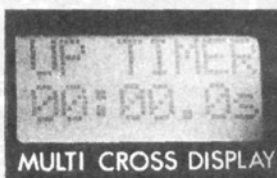
Sound impressive? Well, check this out. The EX-10 also has a dot-matrix LCD (on its left side), and there's a trim-warning function that tells you whether a trim dial has been moved while the radio was turned off. (It also shows you how to restore the correct setting.) To alter the trim settings, you use the six keys on the control pad at the base of the radio. The EX-10 has all this *and* a slew of other groovy features. Is it too technical for everyday R/Cers? Nope! Read on, Buckwheat....

THE BOOB TUBE

The LCD has a four-level brightness adjustment so that you can read it regardless of the lighting conditions. If the battery's power drops below 7 volts, the LCD shuts off. An

much functions

The KO Propo EX-10 radio allows you to control 12 functions in the direct-entry mode. To help you sort everything out, here's a summary of what the functions are and what they do:



MULTI CROSS DISPLAY

and if you crash or tip over, you can stop the clock by pressing the select key. You can also set an alarm to signal after a certain amount of time has passed, e.g., 4 minutes for a race. The lap timer can record times for as many as 75 laps as long as they don't add up to more than 99:59.9 minutes. Now, when you race, you can keep track of your practice/qualifying times and your main-event laps.

◀TIMER

You can select either a stopwatch that will count until you hit the stop button or a lap timer that will click off each of your laps whenever you hit the button. The stopwatch can record times of up to 99:59.9 minutes,



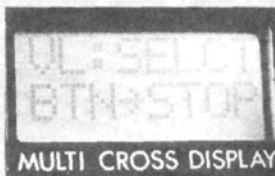
MULTI CROSS DISPLAY



MULTI CROSS DISPLAY

◀TRIM WARNING

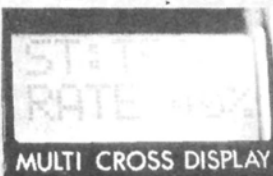
This is the STAB audio-visual warning (see text) that notifies you when the trim settings aren't set properly.



MULTI CROSS DISPLAY

MODEL SELECT ▶

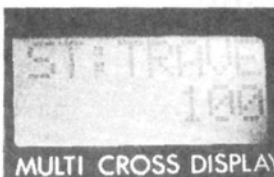
This is what you use to call up the stored trim settings for a particular model.



MULTI CROSS DISPLAY

◀STEERING-TRIM RATE

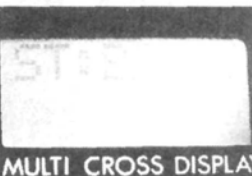
This function enables you to fine-tune your steering servo's neutral point. You can vary the amount of servo movement that each turn of the steering trim dial will cause. No longer will your car wander as it travels down the straights.



MULTI CROSS DISPLAY

STEERING TRAVEL ▶

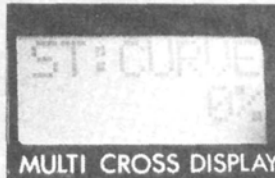
You use this function to adjust how much the servo will move when the steering wheel is turned all the way in either direction.



MULTI CROSS DISPLAY

◀STEERING BALANCE

This allows you to adjust the left and right steering-servo travel separately. The radio will display these individual steering settings on the LCD so that you can check the balance.



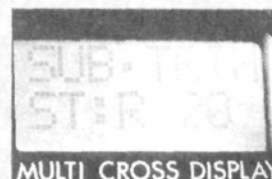
MULTI CROSS DISPLAY

◀STEERING CURVE

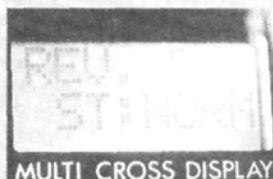
With this function, you can alter the steering servo's sensitivity, i.e., so that it's more or less sensitive toward the neutral point or more or less sensitive toward the outer range of the servo's throw.

SUB-TRIM ▶

This allows you to alter the neutral position of the throttle and the steering channels. For steering, this function comes in handy if you can't remove the servo's linkage without disassembling the car. For throttle, you can set the ESC's neutral point more accurately without playing with its adjustment potentiometer.



MULTI CROSS DISPLAY



MULTI CROSS DISPLAY

◀REVERSE SWITCH

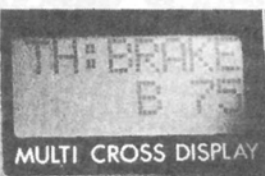
This function lets you determine the operational direction of the steering servo and the throttle servo or ESC.

THROTTLE ▶ HIGH POINT

This allows you to adjust the servo position when the trigger is pulled all the way back to full throttle. You can alter either the full-throttle setting on an engine's carburetor (on gas-powered cars) or set an ESC's full-throttle point (on electric-powered cars).



MULTI CROSS DISPLAY



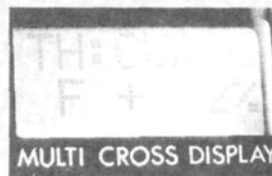
MULTI CROSS DISPLAY

◀THROTTLE BRAKE

The throttle-brake setting controls the servo's reverse (braking throw) or the strength of the ESC's brakes. Use this function to set the amount of braking you want.

THROTTLE CURVE ▶

This function controls how sensitive the servos will be when you move the trigger. You can adjust the sensitivity of the forward drive and the brakes separately.



MULTI CROSS DISPLAY

Hits:

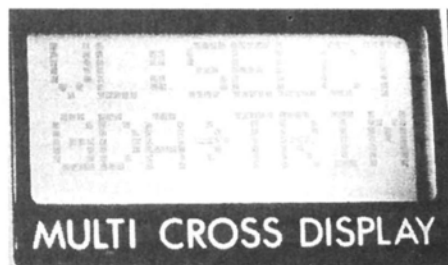
- A vast multitude of functions
- Extremely versatile
- Price comparable with other radios of its type (computer-controlled multi-function systems)
- It will impress your friends

Misses:

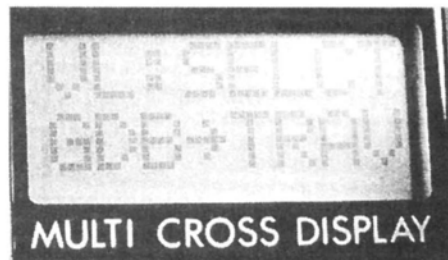
- Damned if I know

alarm sounds when the power drops below 9 volts, so you're given plenty of notice before this happens. Besides, you really shouldn't let it go below 8 volts anyway. There's also a battery-meter display that shows you how much juice you have left, so you have no excuses!

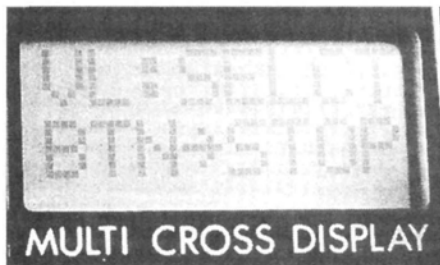
You can scroll through all the radio's functions on the LCD. What functions, you ask? Well, here they are:


Figure 1

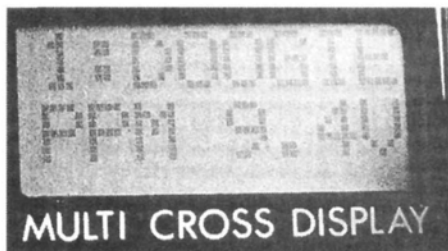
• **Grip-dial function select.** When you set up your EX-10, you first have to assign the grip-dial functions. There are two adjustment dials toward the top of the radio's hand grip. You can program them to control the brake-trim function, the steering servo's travel, or the steering trim. (See Figures 1 and 2.)


Figure 2

• **Thumb button.** Use this to control two functions: the stopwatch/lap timer or the throttle default setting. For throttle control, the throttle or the ESC's throttle setting returns to a predetermined neutral position when you press the button. (See Figure 3.)

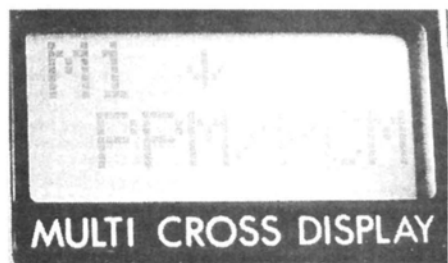

Figure 3

• **Model-name select.** You store the trim settings for each model under a name that can have as many as six letters, symbols, or digits. (See Figure 4.)


Figure 4

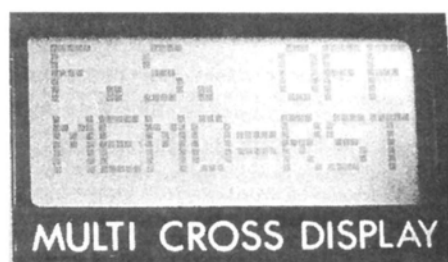
• **Model clear/model copy.** These two functions will save you a lot of time. "Model clear" allows you to erase a model's settings so that you can replace them. With "Model copy," you can duplicate one model's settings for use with another model. Very cool.

• **Fail-safe.** The fail-safe system can be used only in the PCM mode (see Figure 5). You program it so that your car's steering servo and its ESC or throttle servo will return to predetermined default settings if the

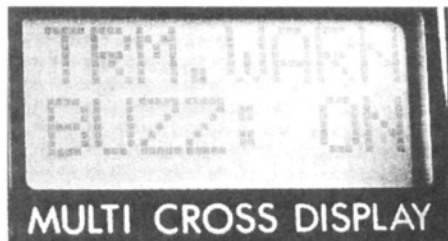

Figure 5

transmitter's signal is ever interrupted for more than .25 second. Note that the best default setting is neutral steering with full brakes. This is especially true if you drive a gas-powered car, which will go until it runs out of fuel or hits an obstacle. (See Figure 6.)

• **Direct-entry mode.** In this mode, you set the trim settings by adjusting the keys and trim dials (see the sidebar for additional info). The position of the grip dials and the


Figure 6

trim settings are saved in memory—even when the radio is off. If, by chance, any of the settings is altered while the radio is off, an audio-visual alarm (Figure 7) goes off when you turn the EX-10 on again. The word STAB—Steering trim, Throttle trim, A (grip-dial A), B (grip-dial B)—appears on


Figure 7

the LCD. (Be sure to check both grip dials to determine which functions they're set to control.) An arrow appears underneath the letter of the function that has been altered, and it points in the direction in which the trim must be adjusted to return it to the correct setting. Not bad, huh?

AND NOW, BACK TO OUR PROGRAM

Has your head exploded yet? I thought that mine would too, but as I was setting up my EX-10, I began to see the light! It really wasn't as hard as I thought it would be. After I had finished setting it up, I installed the receiver in my Trinity Evolution 10 and packed up my gear. *Car Action* photographer Walter Sidas and I headed for a local on-road track to run some tests and shoot some photos. I had installed a really trick, ultra-fast Hitec* servo in the car, and well...let's just say that I found the car slightly difficult to control.

"Right here, John. I need you to hit this spot every time, OK?" Walter said pointing to a corner of the track.

"Sorry, man, but this thing's steering way too fast. It's hard to keep the car going in a straight line," I replied. (Continued on page 98)



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Radio Control
CAR ACTION

KYOSHO NITRO THRASHER

(Continued from page 39)

After running five tankfuls of 15 percent fuel with the carb set very rich (use no more than half to three-quarters throttle!), it was time to lean it out a bit and plow some trenches. By the way, thanks, Kyosho, for the handy fuel bottle and glow starter included with the kit. My neighbor came out with his electric truck, and while he was charging battery packs, I was moving some earth! When the Thrasher was low on fuel, a 2-minute pit stop got it underway again. This monstrosity, with its crunching 4-wheel drive, sneered at obstacles that rendered the electric truck helpless; the O.S. CZ-R's banshee wail and nitro fumes made it that much better!

Do yourself a favor, and learn to care for and maintain this vehicle. It's not a toy, and taking the time to keep everything clean, tight and properly lubricated will prolong the Thrasher's life and your temper!

As far as the suggested hop-ups are concerned, a ball-bearing set (no. KYOC2209) will be my first priority. The Thrasher isn't designed to compete on race tracks, so I don't see a need for the optional ball diffs. That 4WD stadium racer conversion looks interesting, though...hmmmm. Down the road, maybe I'll pop on a set of Double Dare

(Continued on page 146)

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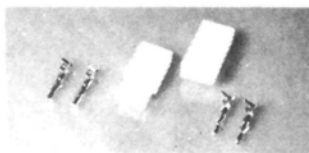
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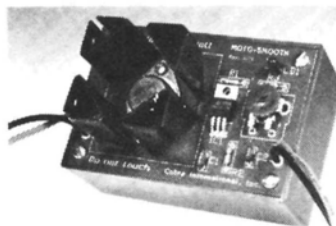
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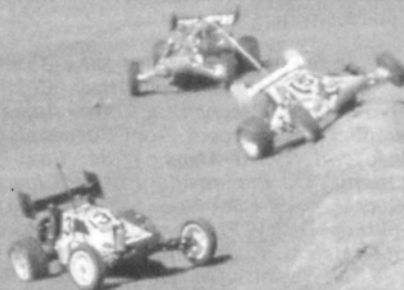
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Ranch Pro



Vince Stollo offered a helping hand before his novice teammate's race.



Here's the overall winner of the event, Jay Halsey (right), with one of his teammates. Jay took his novice team—Kris Hernandez, John Dickson and Jeff Bulley—straight to victory.

THE RANCH PRO/AM RACE was the first of its kind. The format was masterminded by Jim Halsey—who manages the Ranch Pit Shop—in an effort to bridge the gap between novice racers and factory drivers.

The race included the traditional classes: Novice, Stock Truck, Stock Car, Modified Truck and Modified Car. A Pro—or Factory—Class was also added. Each

Factory Class driver teamed up with several novices who were randomly selected by the computer. The Factory Class uses a unique point system. The factory drivers receive points not only for how *they* finish in their races, but also for how their *novices* finish. Hence, the name Pro/Am.

This race format is very interesting; you don't often see factory drivers working so enthusiastically on novices' cars. The factory drivers also offered pointers on driving techniques and racing strategies. With this format, novices can easily approach and talk to their favorite factory racers. During the races, there was great camaraderie as the novices and their factory teammates cheered each other on. In order to place well in the end, this class definitely required a team effort. Most of the factory rivalries were put aside as the factory drivers concentrated on getting their novice teammates up to speed; when their novices finished well, it was more rewarding than winning their own heats.

Originally, the race was scheduled for the weekend of January 17, but unfortunately, the weather didn't cooperate. It had been raining all week, and it seemed as if there

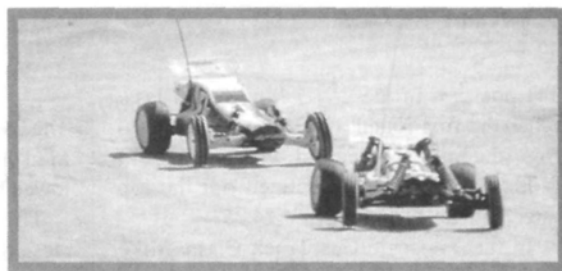
was no end in sight. The race was rescheduled for the weekend of February 7, which didn't look very promising either. Everyone hoped that the overcast sky would clear. The race started on schedule, but a little more than halfway through the first qualifying round—guess what?—it started to rain! So, the race had to be rescheduled again—this time, for March 7. I guess the old saying, "The third time's the charm" is true, because the weather couldn't have been better for race day.



Race supervisor Jim Halsey passed out a few goodies among the racers. You should have seen them go nuts as he tossed the items to the crowd.

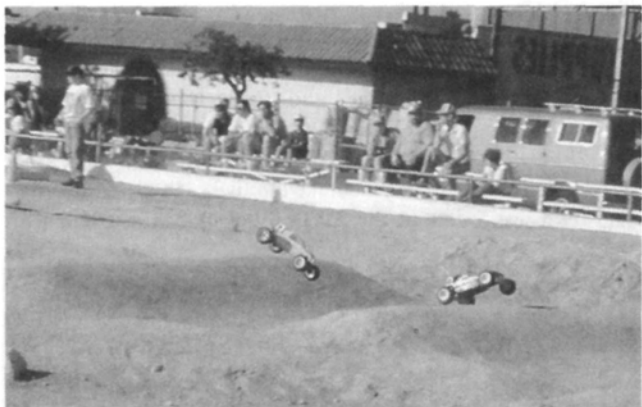
BOLDLY

o/Am



TAKE 3

by JACK JOHNSON



PHOTOS BY JACK JOHNSON

To help the novices pick up speed, the top drivers offered tips on good lines and proper setups.

ROUND ONE...FINALLY, AFTER TWO MONTHS!

Once the first qualifying round was under way, it wasn't long before the factory drivers started to brag about the successes of their teammates. Then, they returned to the pits to help the novices go faster in the next round.

In the 2WD Stock Class, the one to beat was Chad Rott, who posted a qualifying time of 4:01.75 for 10 laps. He was followed by Andy Jacobson (of Andy's R/C Products), who completed 10 laps in 4:07.74. Rounding out the top three was Tony Maganuco with a time of 4:09.84 for 10 laps.

With all the help from the factory drivers, the 2WD novices were almost as fast as the Stock drivers. Posting the fastest time for round one was Chris Corcoran, who finished 10 laps in 4:08.98. Greg Smith followed very closely with 10 laps in 4:09.04—just 6/100 second slower than Chris's time. In third, Marcus McGowan was just over a second behind with a 10-lap time of 4:10.33.

In Novice Truck, the



Kyle Reed gave a young, up-and-coming racer a few pointers on tuning setups. The locals thought that it was really cool to meet and hang out with their favorite top drivers.

fastest time was Dave Gerhardt's 4:14.15 for 10 laps. Shawn Blackwell was second with 10 laps in 4:15.66, and Mark Reel was third with 10 laps in 4:16.92. After the first round, Jammer and Brian Kinwald had bragging rights, since their drivers were TQ in the two



Team Associated's Brian Kinwald (center) checked out the racing action before one of his races. Brian took the win in the 2WD Modified A-Main.

Novice Classes.

Stock Monster Truck proved to be the fastest of the stock classes, as Shawn Stout blazed around the track and put in a time of 4:11.92 for 11 laps. Bob Stout delivered the second half of the one-two punch with an 11-lap run in 4:13.91. Also in the 11-lap club were Brian Casteel (4:19.65) and Louie Fernandez (4:23.21).

A blistering time of 4:19.83 for 12 laps put Brian Kinwald in the

Place	Factory Driver	Novice Drivers	Average
1	Jay Halsey	Kris Hernandez, John Dickson, Jeff Bulley	3.91
2	Jammer	Chris Corcoran, Shawn Blackwell	5.58
3	Jim Gouge	Michael Bauer, Ariene Bolton, Kenney Alcantara	6.13
4	Bryan Peterson	Troy Lyons, Marcus McGowan, Phillip Soloman	6.44
5	Brian Kinwald	Cory Leavers, Craig Kitts, Michael Huyhn, Dave Gerhardt, Nathan Roxas	6.88
6	Bob Novak	Andy Matson, Marcus McGowan, Charles Jarvis, Brian Johnson	7.80
7	Chris Rahe	Don Adamson, Mark Reel	7.53
8	Gary Kyes	Greg Smith, Craig Kitts, Ariene Richmond	7.53
9	Gil Losi, Jr.	Chris Meredith, Hugo Pellon, Shaun Judkins	7.67
10	Tyree Phillips	Logan Muszynski, Richard Parker, Mark Thriakill	7.92

GONE BEFORE!

GOING WHERE NO RACE HAS

RANCH PRO/AM

TQ position in the 2WD Modified Class. After the first round, Chris Rahe, just missing 12 laps, was second with 11 laps in 4:00.75. Mike Weed rounded out the top three with an 11-lap run in 4:14.35.

In the 1/10-scale Gas Truck Class, Mike Weed—who drove a prototype truck based on the LX-T chassis—took the TQ spot with a run of 11 laps in 4:21.04. Although he didn't finish the heat, Gary Kyes—who drove a Duratrax LX-T conversion—was still fast enough for second spot with a 10-lap run in 3:59.80. Close behind, Dan Disenza finished 10 laps in 4:00.03.

From the way the trucks flew around the track, you would never guess that the Factory Class was limited to six cells with a modified motor. This class wasn't based on qualifying times; instead, points were awarded for the finishing position. Brian Kinwald and Vince Stolo won the two heats. The points awarded for the first round of Factory trucks were added to the points that the novices received. Since some drivers had more teammates than others, the point total was then averaged. After round one, the top five were Jay Halsey, Brian Kinwald, Jammer, Chris Rahe and Bryan Peterson. Things would definitely change, though, as the race progressed.

ROUND TWO

After the second and final qualifying round, Chad Rott remained at the top in 2WD Stock. Jeremy Frazier slipped into second position, followed closely by Andy Jacobson.

In the 2WD Novice Class, the top three remained the same after this round. Chris Corcoran was still TQ.

During round two, quite a bit changed in the Novice Truck Class. Dave Gerhardt slipped to third qualifier as Michael Bauer and Mark Reel qualified first and second. Team Losi drivers Jim Gouge and Chris Rahe must have really spent some time with these two; they had definitely shown improvement since the first round.

The only other class that had a change from the first qualifying round was the 1/10-scale Gas Truck Class. B.J. Christensen posted a new TQ time, which bumped Mike Weed to second position. Dan Disenza took third.

The second round for the factory drivers was completed. Brian Kinwald and Ron Rossetti picked up wins for their teams in this round. This gave Brian two consecutive wins, but the important thing was to keep his novices running fast. Time would tell if his help would boost each of his drivers to the top of his class.

THE MAIN EVENTS

The 2WD Novice B-Main was won by Andy Matson. Tim MacDonald was second, followed by Chris Meredith in third.

The 2WD Novice A-Main was a very close race. In the end, Marcus McGowan just edged out Michael Bauer for the win. Third place went to Cliff Johnson, and Greg Smith and Kris Hernandez took fourth and fifth.

The top three in the Novice Truck D-Main were Don Adamson, Billy Young and Nick Sunberg.

In the Novice Truck C-Main, Greg Scott, Justin Lett and Shaun Judkins took the top three positions.

Jeff Bulley won the Novice Truck B-Main. The race for second and third was

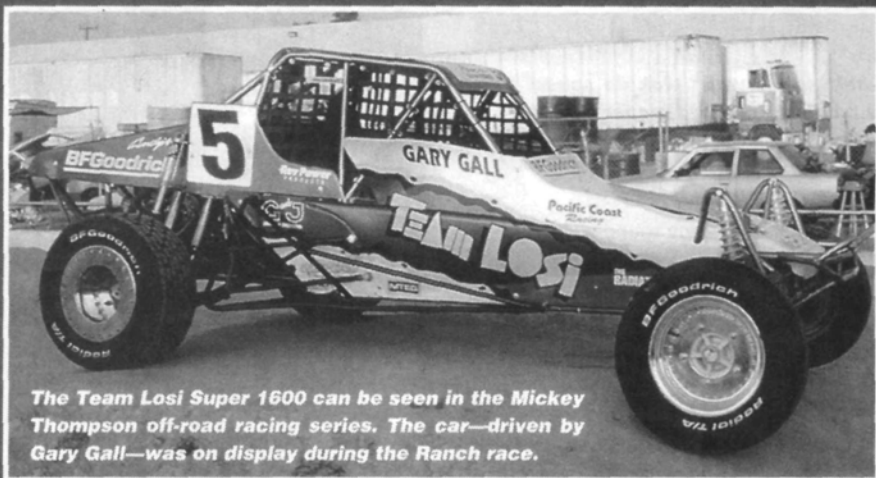


close: at the finish line, Chris Corcoran took second, just beating Bill Lashers, who placed third.

In the Novice Truck A-Main, Dave Gerhardt raced a full second faster than the TQ time and took the win. Marcus McGowan finished second, and Mark Reel took third. Michael Bauer and Mike Lasher rounded out the top five.

In the 2WD Stock A-Main, Chad Rott

TAKING IT TO THE TRACK



The Team Losi Super 1600 can be seen in the Mickey Thompson off-road racing series. The car—driven by Gary Gall—was on display during the Ranch race.



Gall's car comes with a Losi "Revolution" racing motor...

ON DISPLAY DURING the Pro/Am event was the full-size racing buggy sponsored by Team Losi. This vehicle—driven by Gary Gall—races in the Mickey Thompson Grand Prix series throughout the country. It's a top contender in its class, and you can see it on ESPN when the races are aired.

Full-size and R/C racing share many ideas and techniques. Because Team Losi is actively involved in many types of full-size auto racing, they're able to learn from and share information with other engineers involved with full-size cars. Their involvement also introduces the R/C industry to many people who enjoy other forms of racing.

Team Losi sponsors the Mickey Thompson off-road racer and an Indy car that will race the entire CART series this year. Look for them!



...and Losi's "Hard Body" shocks.

RACIN' ROOTS

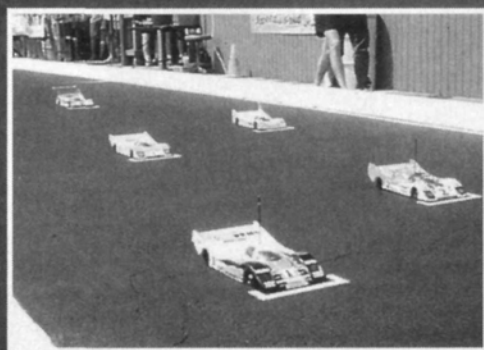
THE RANCH PIT SHOP has long been known for its fantastic facilities and its high-quality race tracks. Earlier this year, it was decided that the asphalt track—which has been used for many National and World events—would be replaced with a large, premier, off-road track. About forty truckloads of dirt filled a large "sandbox" that was built around the existing asphalt track. The result is one of the nation's largest off-road tracks.

Since the track is built on asphalt, rocks should never be a problem on the surface. The old drivers' stand—which is shaded for hot days—is still in use, and a wheelchair ramp makes it easier for everyone to join in the fun. The old pit tables are also still in use, so there's plenty of pit space for the racers.

The Ranch Pit Shop plans to pave the back area, where the off-road track was once located. Once this has been done, a temporary asphalt track will be built. Then, the Ranch Pit Shop will be able to host large events for both off-road and on-road.



Here's the new, improved off-road track at the Ranch. Plans for a new road course are in the works.



Here's a look at the old on-road track, which played host to the IFMAR 1/10-Scale On-Road Worlds last year.

proved his TQ status by taking the win over Rick Young, who came in second. Jeremy Frazier, Herb Hanss and Derrick Marsteller finished out the top five in this class.

The Stock Monster Truck A-Main was another close race. Shawn Stout beat Brian Casteel by less than one second. Brandon Upshaw finished third, and Derrick Marsteller and Louie Fernandez took fourth and fifth.

In the 1/10-scale Gas Truck A-Main event, Mike Weed ran away from the pack and almost lapped the entire field. B.J. Christensen finished in second place, followed by Jerry Wachtel, Gary Kyes and Billy Trawick.

In the Modified Monster Truck A-Main, Brian Casteel took the win. Second and third places went to Louie Fernandez and Lenny Langford. Tony Tossetti and Roger Tibbets finished fourth and fifth.

The 2WD Modified A-Main was the fastest Main of the day. Brian Kinwald took the win, followed by Scott Roberts. Mike Weed, Randy Kato and Todd Carriseo finished third, fourth and fifth.

TOTAL 'EM UP!

After the Mains had been completed, the novice drivers were awarded points for their overall finishing position in the class. This really made a point difference because the C-Main drivers earned three times as many points as the A-Main drivers. When all was said and done, Jay Halsey's team was on top with a total point average of 3.91. Jammer's team took second place with an average of 5.58, and Jim Gouge's team earned a 6.13-point total that put them in third place.

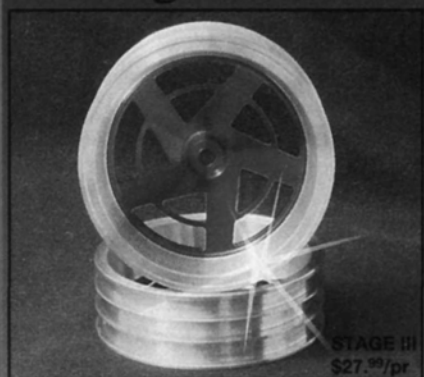
IT'S A SUCCESS!

The atmosphere at the Ranch Pit Shop Pro/Am was great, and I think that all the racers had a good time. I hope that this type of race will become more common. This format not only helps beginning drivers, but also provides an opportunity for exhibition races between factory drivers.

There were a total of 18 teams, and each had at least three novices. With this many drivers getting pointers from the pros, there are sure to be many more happy race winners at their local tracks.

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KYOSHO NITRO THRASHER

(Continued from page 134)

wheels and tires and Kyosho gold shocks for good measure. But right now, I'm having a ball with this nitro-fuming knockout—just what the doctor ordered!

* Here are the addresses of the companies mentioned in this article:

Kyosho/Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826; (217) 398-3630.

JR; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-0022. ■

CACTUS CLASSIC

(Continued from page 95)

driver Jerry Walter.

• **Truck Modified.** Here, we saw seven factory drivers against three independents. As he did in the 2WD Modified Class, Anderson jumped right to the lead and stayed there. He had company for a while, with Jack Johnson, Matt Francis and William "Burrito" Funk right on the tail. They all dropped back, except Johnson, who just dogged Anderson for the entire run. Anderson gave no space to Johnson, who made one last stab at the final turn, but to no avail. Anderson walked away with the win and Johnson settled for second. Third was Bryan Peterson, who won this event three years ago.

Again, Anderson used a box-stock Losi LX-T vehicle. He merely lightened the chassis to bring it to minimum weight, gave it the touch of magic and kicked butt. Let that be a lesson to all of you future winners: if you want to win, keep your car in good shape.

The Seventh Annual Cactus Classic was fast and fun for all. The only complaints were about the track surface, but you can't run so many cars in so little time without the track suffering some kind of wear. By the way, this race was counted by hand all the way, and scoring was perfect.

Thanks to Pro-Line, the Cactus Classic was a success of monstrous proportions. You had better make plans right now for the 1994 running of the hottest race without a Nationals title. ■

SCOPING OUT

(Continued from page 125)

CONCLUSION

Because the Viper is new, it hasn't yet had a chance to prove itself at the track, but judging from its lab-test numbers, it should be a worthy contender.

It is fairly small and light, so it will fit almost any car, buggy or truck. It comes with a complete set of factory-installed motor and battery connectors, which make it very convenient to install, but does rob

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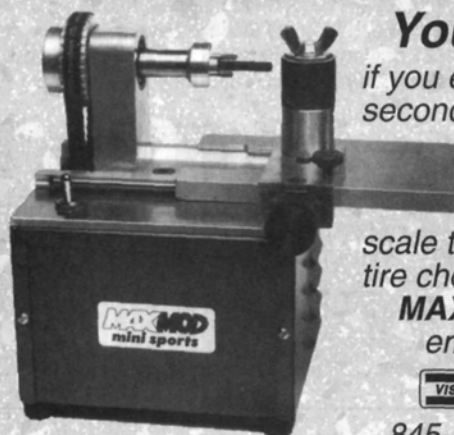
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the motor of some of its power. Just remember that, if you wire up something backwards, you will have bought the farm (so to speak).

Folks who just can't deal with computers might be scared off by the fact that the Viper is programmable. They shouldn't be afraid; it's very easy to program. The instruction book takes you through everything step by step, and the label on the case

has a color-coded crib sheet.

Looking for a new weapon to compete with at your local track? Check out the Viper; it might be the trick part you're looking for.

**Here's the address of the company featured in this article:*
SCI Power Corp. of America, P.O. Box 13099,
Sarasota, FL 34278. ■

KO PROPO EX-10

(Continued from page 133)

He grinned at me and shouted, "Don't be a buffoon! Can't you fix it with your radio/microwave oven?"

I told him to hold on while I tried to do just that. And then I remembered that, to reduce the steering's sensitivity, I simply had to adjust the steering curve so that it would

(Continued on page 148)

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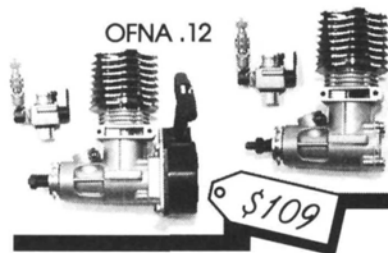
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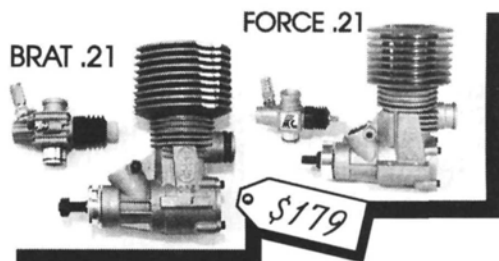
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BEARINGS	YES	YES	YES
RETAIL	\$109	\$179	\$179



KO PROPO EX-10

(Continued from page 147)

slow down the servo action slightly. After I did that, the car steered more to my liking, and Walter and I walked away with some glorious shots.

Since that shoot, I've used the EX-10 with almost every car I've run. It's so easy to adjust and so versatile that I don't think I could live without it. Now, don't get me wrong: there are 400 million other radios (give or take two or three) that can do the job—and do it well. Backyard bashers may want to look elsewhere, but racers should definitely give this radio the once-over.

If you're in the market for a new hi-zoot radio that slices and dices—one that's a step above your old radio—check out the EX-10. It smokes!

*Here are the addresses of the companies mentioned in this article:

KO Propo, 25-10 Sendagi, 3-Chome, Bunkyo-Ku, Tokyo, Japan.
Hitec RCD Inc., 10729 Wheatlands Ave., Ste. C, Santee, CA 92071; (619) 258-4940

LETTERS

(Continued from page 9)

MITCHELL PICKS MUGEN!

On April 29 through May 2, 1993, a friend and I were in Atlanta, GA, for the Kyosho/Car Action Gas Off-Road Championship races. We raced in the 1/10-scale gas truck class. I finished first place in the G-Main truck class. (How could I lose? I was the only one racing.)

The reason for this letter is to express my appreciation and gratitude for the helpfulness and courtesy extended to my friend and me by the members of the Mugen racing team—the drivers, the mechanics and especially Chester, the team manager.

We were fortunate enough to have chosen a place to pit directly next to the Mugen Team, and when they saw our inexperience in tuning our gas engines and setting up our trucks for racing, they volunteered their time and services to help us—all in the good spirit of competition. This is even more commendable since we were racing a vehicle from another manufacturer, who, by the way, led us to believe they would be there with factory racers and team support, but did not even show.

Following the events of the weekend,

and seeing the professional courtesy and support extended to others outside the Mugen team, my decision as to which 1/8-scale off-road vehicle to invest in has been made much easier.

MITCHELL CARVER
 Aberdeen, MD

R/C CAREER INSTITUTE

Being a freshman in high school, I knew it was time for me to start thinking about my career. Using my interests and skills as a guideline, I came up with the wonderful idea of being a R/C car designer. I love art and design, and I am proficient in all classes, especially math and science. One of my favorite hobbies is off-road racing, and it thrills me to think that I could be on the design team of a company like Team Associated or Team Losi.

Unfortunately, I have no clue as to the path I should take to pursue this career. What college courses should I take? Who do I contact for more information? I would appreciate any information you could give me.

DONNIE MILLER
 New Braunfels, TX

(Continued on page 178)

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LETTERS

(Continued from page 148)

Just off the tops of our heads, we'd say that you should start off with courses in mechanical engineering, computer drafting and physics. You should also read all the full-size automotive handling books you can get your hands on...and practice, practice, practice driving your R/C cars. Write to the companies you'd like to work for and ask for some guidance. Good luck! LA

FAITHFUL STICKER BOY

I am 13 years old, and I've been a reader of your magazine for four years now. I've had a subscription for four months, and I've enjoyed reading it very much. I learn a lot of technical terms and all the "hits" of cars. I would appreciate it if I could receive a sticker to show that I'm a proud reader of your mag.

DAN DROZD
Orland Park, IL

Stay tuned, Dan; I sent you a couple of sheets of Car Action stickers. Thanks for the kind words. JH



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